Chron.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington 25, D. C.

Release No. 61-96

For Release: Immediate
May 1, 1961

STATEMENT BY JAMES E. WEBB, ADMINISTRATOR, NASA

For more than two years now the United States has moved forward with its Mercury Manned Space Flight Program. This program from its inception has been operated in the belief that the public has a right to know what this country is doing in the space field. The press has had full access to the program. This has been so because we operate in a democratic society where our failures are known as well as our successes.

I think the press and the public should be aware that this frequently places a serious psychological burden on the United States all over the world. If any one flight is delayed or is not a success, every detail is completely reported and is contrasted to the Soviet space effort, the events of which do not become a matter of public record until a success is achieved. The recent Soviet flight was already successfully in progress before announced, and neither details nor the scientific data collected are yet available.

NASA has not attempted to encourage press coverage of the first Mercury-Redstone manned flight. It has responded to press and television requests with the result that over 400 representatives of the press, radio and TV are now at Cape Canaveral.

Our first manned space flight is an important milestone in the progress of our space effort, but we must keep the perspective that each flight is but one of the many milestones we must pass. Some will completely succeed in every respect, some partially, and some will fail.

From all of them will come mastery of the vast new space environment on which so much of our future depends.

- end -

Chron,

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

7:32 A.M. EST May 2, 1961

CAPE CANAVERAL, FLA. -- An attempt to launch a manned Mercury spacecraft here today has been postponed due to bad weather here and in the recovery area down range. The pilot selected for the first manned flight attempt was Alan B. Shepard. He was prepared for flight but held in the pilot preparation area. No new launch date has been set but the minimum recycle time is 48 hours. The pilot will remain in the crew quarters in the NASA Mercury hangar here.

- End -

MR-3

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Release No. 61-97 May 5, 1961

I would like to add my congratulations to those of President Kennedy to our first American astronaut, Alan B. Shepard, to his wife and family and to every member of our United States space team. The National Aeronautics and Space Administration deeply appreciates the splendid work of every man and woman who has contributed to todays success -- in government, in industry and in the press, radio and TV.

To the six astronauts who did not fly today, but without whom todays flight would not have been possible, go our special thanks, they also will make history in our future space flights, all are outstanding and all are highly qualified for the tremendous tasks we have yet to undertake.

To Robert R. Gilruth, Director of NASA's Space Task Group, to Dr. Abe Silverstein, Director of Space Flight Programs, and to all who have worked with them for so many months on Project Mercury, go the thanks of the Nation.

Speaking for the Space Administration's four major divisions, our Offices of Launch Vehicles, Space Flight, Life Sciences and Advanced Research, we are happy to accept President Kennedy's challenge to redouble our efforts and to proceed with utmost speed and vigor in the further development of our space program.

The Scientific and Technological competence demonstrated before the eyes of the world today by every component of all United States Space organizations was worthy of note by those everywhere responsible for placing a true evaluation on America's capacity for large scale organized effort in such a new field as space. This is the proof that we are moving ahead.

Chron.

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: UPON DELIVERY
About 1 p.m.
Monday, May 8, 1961

Release No. 61-100

MR-3

Remarks by

JAMES E. WEBB, ADMINISTRATOR
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
STATE DEPARTMENT AUDITORIUM
MAY 8, 1961

Good afternoon, ladies and gentlemen.

The historic Project Mercury flight on last Friday was a dramatic demonstration before the eyes of the world of how the United States Space team, through effective large-scale organized effort can pass one very important milestone on the long road toward the mastery of the space environment by man.

Symbolic of the successful solution of every problem and the accomplishment of every necessity to earn the Navy "Well Done" or the NASA "A-OK" is the man you desire to question, Alan B. Shepard, Jr.

But before you do, let me give you a figure or two to indicate what it means to ride a rocket.

A chronology published by the Congress shows:*

That with respect to the V-2 rocket in Germany in 1942, out of 7 launchings only one succeeded. In 1943 out of 24, only 4 succeeded. After thousands of launches during the war the record of the V-2 rockets built in the United States left much to be desired.

With respect to the Jupiter rocket, out of the first 10 launchings 7 succeeded; out of the second 10, 8 succeeded; and out of the last 4 every one succeeded.

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* "A Chronology of Missile and Astronautic Events", Report of the Committee on Science and Astronautics, House of Representatives, Washington, 1961.

With respect to the Thor rocket, out of the first ten, four succeeded; after 40 firings of Thor the next ten (from 40 to 50) all succeeded.

With respect to the Atlas rocket, out of the first ten, five succeeded; out of the ten from 20 to 30, all succeeded; but out of the 10 from 40 to 50, six succeeded and four failed.

With respect to the Polaris rocket, out of the first ten, five succeeded; out of the ten from 40 to 50, seven succeeded; but out of the ten from 70 to 80, nine succeeded.

The lesson is clear. If we are to have our spectacular successes, openly arrived at, with ever larger and ever more complex rockets, the early test flights, unmanned of course, will involve some spectacular failures. In the drama of the countdown, we will never know which it is to be. But to keep perspective, I should tell you that, as we did in planning Project Mercury, this lack of rocket perfection will be taken into account in manned flights by providing an escape system for the astronaut in event of the failure of the rocket.

In thrust, the first stage of Saturn is 20 times the Redstone, and we will test-fly it this year. In thrust, the first stage of Nova is estimated at 100 times the Redstone, and we are already testing one of its engines. The complete Nova will likely measure two-thirds as tall as the Washington Monument.

From all we know about the past, a portion of the early test flights of these gigantic rockets will appear as failures to those who view and read about them. To the space scientist and engineer, however, they will provide the knowledge, the experimental proof of technology we cannot fail to master and still survive.

In the months ahead, when you see on your TV, the launchings of the brave men who sit beside Alan Shepard here today, it may be well to remember this record. Even with our best efforts no specific flight can be guaranteed absolutely safe, but from every flight comes more knowledge to advance our progress in space.

Now, to make the proper introduction, I present the Director of NASA's Space Task Group, responsible for Project Mercury, a man who knows how it feels to send a man to ride a rocket, Robert R. Gilruth.

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: IMMEDIATE
5 May 1961

Release No. 61 - 99

MERCURY REDSTONE 3
PRESS CONFERENCE
Cape Canaveral, Florida

PRESENT:

JACK KING, PIO, NASA, Moderator.

ROBERT R. GILRUTH, Director, NASA Space Task Group.

WALTER C. WILLIAMS, Operations Director, Project Mercury.

WERNER VON BRAUN, Director, Marshall Space Flight Center.

DR. HUGH L. DRYDEN, Deputy Administrator, NASA.

DR. KURT H. DEBUS, Director, NASA Launch Operations.

REAR ADMIRAL F. V. H. HILLES, Commander, Mercury Recovery Forces.

DR. STANLEY C. WHITE, Project Mercury Flight Surgeon.

COLONEL ROBERT S. MALONEY, USAF, Deputy Commander for Range, Atlantic Missile Range, representing General Layton I. Davis, Commander, Air Force Missile Test Center.

JOHN H. GLENN, JR., Astronaut.

LEROY GORDON COOPER, Astronaut.

KING: Good morning, ladies and gentlemen.

I would like to announce first that we expect to have a tape recording of Al Shepard's voice available in about forty-five minutes.

Now I would like to introduce the gentlemen at the table. Going clockwise, Astronaut Leroy Gordon Cooper; Dr. Werner von Braun, Director of the Marshall Space Flight Center; Dr. Kurt H. Debus, Director of NASA Launch Operations; Mr. Walter C. Williams, Operations Director, Project Mercury; Mr. Robert R. Gilruth, Director NASA Space Task Group; our special guest, Dr. Hugh L. Dryden, Deputy Administrator of the National Aeronautics and Space Administration; Admiral F.V.H. Hilles, Commander of the Mercury Recovery Forces; Dr. Stanley C. White, Project Mercury Flight Surgeon. Dr. White was at the flight surgeon console at the Mercury Control Center this morning. Next, Colonel Robert S. Maloney, Deputy Commander for range, Atlantic Missile Range, representing General Layton I. Davis, Commander, Air Force Missile Test Center. And last, but not least, Astronaut John H. Glenn, Jr.

Dr. Dryden, would now like to make a statement.

DRYDEN: Gentlemen, this is a very happy and rewarding day for all of us who have in any way been connected with Project Mercury for the past few years.

As you know, there are literally hundreds and hundreds of people who have made possible this success. I will not begin to name all of them because I will leave somebody out. You have some of the principal persons concerned here at the table. Bob Gilruth, the Director of the Project, Walter Williams, the Operations Director; two of the Astronauts, Dr. von Braun, and the others. You have been introduced to all of them.

I want to make a statement about the scientific and technological significance of what you have witnessed today.

It is the beginning of the exploration of space by the Astronauts of the United States, a very auspicious beginning, one which we expect to lead us eventually far from the surface of the earth.

We have not finished the exploration of space by this one flight. The program will be continued. There will be other milestones. We do expect to have an orbital flight, as you know, and we are prepared for it, and feel that we are ready to go. We expect to go beyond the three-man orbital flight into flights of longer duration and with more people, and in time we expect to go to the moon and back.

All of this will take the same cooperation between scientists, engineers, industry, the other services that support us in this effort, and the people of the United States.

You have all had a part in this, you have gone through the countdown with us, and I am sure that the hearts of all of us beat faster than that of the Astronaut, if I can judge from looking at the records.

This kind of an accomplishment was made possible by the great development of science and technology in this country. If you examine the capsule and its systems, you will find in it the fruits of the labors of literally hundreds of persons, beginning back with the scientists in this country who first developed solid-state devices, those who are active in the advanced development of the electronics, those who were concerned with their dynamics, with heat protection, and all of the many other sciences that go into it.

The life sciences have been an important part in the support of this Project. It is this background of American science and industry that really has made this accomplishment possible.

It has brought us an experience that we cannot obtain in any other way than by going through it. We have begun our experiences with operations in space. We have learned a lot of things about this which in due course you will hear about.

As far as science is concerned, there have been some scientific contributions from this flight. I would say that principally they have been in the reactions of the Astronauts, the beginning steps in studying the effects of weightlessness and of the other aspects of the space environment.

I would not, however, at this point wish to emphasize unduly the science involved, the scientific products of this flight, because I believe that we are in the manned space flight business primarily because it enables us to develop a technology at the frontiers of science, the development of materials, devices, and methods that will find application throughout our whole industrial life.

I think that is enough for me. I believe Bob Gilruth will take over next.

GILRUTH: Ladies and gentlemen, I think you are all pretty well briefed on the details of the flight. I will not say any more about the flight other than that it was a very satisfactory one. I would like to use my initial time here to make sure you all realize just who comprised this team that made this flight possible. It does, as Dr. Dryden said, involve many, many people. For example, the McDonnell Aircraft Corporation and all of their various contractors who produced this flight vehicle, and also carried out the flight preparation;

The Marshall Space Flight Center, which is represented here at the table, as far as the booster is concerned; is their booster;

The Recovery Forces, which involved the Navy, Air Force, and Marines, which are represented here by Admiral Hilles;

The AMR Range here, which had a very important role;

And last, the Space Task Group of the NASA, their design engineers, operations people, and pilots.

All of these people in this team worked very well together and I think we are all, and I am sure you are, very proud of them.

I would now like to turn the mike over to Walter Williams.

WILLIAMS: At the risk of being repetitious, since this flight was essentially reported in real time, I would like to cover a few of the technical details of the flight.

The countdown this morning actually went quite well up to T-15. In fact we were making time along the way and then the weather got into our hair. Things didn't get worse, exactly, but we did begin to have problems.

However, with the fine crew of Dr. Debus and our own blockhouse crew on the capsule they solved their problems and got away to a very successful flight.

This flight on quick-look information was about as nearly perfect as we could expect.

The primary systems were used throughout. There were no in-flight emergencies requiring resorting to the secondary or back-up systems. The cabin pressure regulated quite well and maintained temperature quite well.

There was only a few degrees variation in both the cabin and suit temperature over the entire flight.

During the boost phase approximately 6 G was reached. There was of the order of five minutes of weightlessness. Ten G were reached during re-entry, a period of about half a minute. I think the altitude and speed figures were announced to you earlier.

Of course the parachutes all functioned normally. The pickup was rapid and Admiral Hilles will go into this in detail.

All in all there is nothing to report other than that it was a very good flight.

On the personal side of it, I would like to say that it is truly an honor and a privilege for me to be intimately associated with this program. It was an honor and privilege to watch Al Shepard at work today. He performed as a true engineering test pilot, and in listening to his voice, as you will hear, he might as well have been sitting here on the ground in a simulator. I would say also on a quick-look basis with this duration of space flight he appeared to be having no problems whatever.

GILRUTH: I think now I would like to call on Dr. von Braun.

VON BRAUN: I can only add that this is a very happy day for us. We had a good shot. We had a perfect flight and our astronaut is safely back on the ground, and this is the most important part of it.

We at the Marshall Space Flight Center, of course are quite proud that our Redstone had been selected for this first launching of an American austronaut, and also the Redstone itself is a reliable old work horse as far as its capabilities and record as a military missile is concerned. But I think the fact that you suddenly add a human occupant to this vehicle adds a great deal to the problems that have been absolutely new to us also, particularly in the preparation of the countdown and the actual launch operation which was conducted by our Dr. Debus, who is sitting to my left. A great of new things have been incorporated to make such a manned flight possible.

I think this event today is just another example of what teamwork can accomplish. This was a teamwork involving the Space Task Group of Dr. Gilruth plus the astronauts, all of them, Commander Shepard in particular.

It involved the Chrysler Corporation, which produced the basic Redstone that was used here today.

It involved our Marshall Space Flight Center, both the assembly operations here as well as the launch operation here at Cape Canaveral.

It involved the Air Force Missile Test Center here which made a great contribution in providing operational support and tracking for this.

And finally, the Navy on the receiving end had the happy task of picking one of their own out of the water today.

I can only repeat what Mr. Williams just said. I consider it a great honor to be associated with this project and I am mighty happy about its outcome.

I would like to pass the mike now on to my good friend Dr. Debus, who was the launch director today and operated in the blockhouse from where the bird was fired.

DEBUS: Ladies and gentlemen: I have very little to add to what has been said before. To say everything went normally and smoothly would be not quite true. We had some excitement. But if you regard the complexity of this operation and the coincidence that had to be established by all operating organizations and machines and instruments, it was relatively smooth. We had no major problems. The ones encountered could be fixed.

It is also for me a great honor and privilege to be associated with such a fine team as has been working together today to bring this first man into space.

Thank you.

GILRUTH: Thank you, Dr. Debus.

Admiral Hilles?

HILLES: Of course, we felt like we were in a kind of a World Series, and we wrre delighted that we could catch the crucial fly.

COOPER: I will second that.

HILLES: I want to assure you that the forces planning for this have been working for a great long while and wouldn't have been accomplished if it were not for the resources of every one of them participating in this particular catch. Every one of them worked toward it. We are anxious and pledge that we will give exactly the same treatment to the rest of you when you report for your tour.

We had, as you know, and as has been pretty well explained, a very fine day after the superb flight which followed all the patterns as actually predicted, and was only seven miles from the space which had been predicted previously. We found that the conditions worked exactly as we wished.

At the beginning, of course the first sighting we had was an eyeball sight, with an electronic indication immediately upon the deployment of the main parachute. This occurred about 0944 EST. About 0949 the capsule impacted. However, prior to that time, as a result of the eye-sighting, the helicopters had proceeded toward the area, which was very close to the Lake Champlain, and were actually following it down. So they were immediately over the top of the capsule when it hit the water. It made a very fine landing.

The communications were splendid with Al Shepard, and he immediately said that he would like to get out of the capsule, which he did. Within five minutes we had him out and on board the helicopter. Then we of course, immediately thereafter, picked up the capsule, one minute later, and proceeded back to the Lake Champlain, where he landed on board at 1000 and walked off up the deck apparently in fine spirits. This was eleven minutes after the impact.

The landing area actually was about 297 statute miles down range and it was eastnortheast of Grand Bahama Island 155 statute miles.

The plan of course is, after he has been released by the doctors, he will be flown by one of our carrier on-board delivery planes directly from the Lake Champlain to Grand Bahama Island and we anticipate that this will be sometime this afternoon.

I, too, wish to say that I do not have the time, I know you do not have the time, to recount all of the people who participated and the ones we depended so heavily on for support. We are delighted and hope to always be a member of the team. It has been a pleasure to wirk under Dr. Gilruth and NASA.

I also want to express my appreciations to the Atlantic Missile Range, which not only supported us in many of our administrative things here but who actually provided Lt. Col. Cannon, who was in charge of the launch site recovery group in the event of an abort.

We had great support of course, also, from the Army, which provided some of the vehicles that appeared at the launch area, and the Navy and the Marine Corps, which provided the bulk of the forces in the recovery force.

I do think that this illustrates in a very fine way the flexibility of the forces. As you know, Admiral Clark, who is normally on antisubmarine warfare business, was able to accomplish these jobs as a normal part of his regular patrol work here in the Atlantic area.

I think you know that immediately after that, when Shepard arrived on board the ship we got an emmergency call from the White House, and after a few circuit changes we were able to get the President on to talk to Alan Shepard directly from the White House.

We are, of course, very proud of Alan Shepard and those of us in the recovery force salute him as a fine pioneer and a courageous man as America's first astronaut.

GILRUTH: Thank you very much, sir.

Colonel Maloney, do you have some remarks?

MALONEY: Yes. Speaking for the Atlantic Missile Range, I believe most of you know that our primary job is to provide instrumentation and tracing support of the flight.

As Mr. Williams indicated, we had some anxious moments early in the morning. First of all, the low clouds moved in and obscured our objectives which we needed to cover the early critical portions of the flight. And in the last few minutes we had some computer problems. We slowly got through to these and got to lift-off. At that time Commander Shepard took over and everything seemed to work perfectly. All I can conclude is that man is a lot better than a machine. And the sooner we get men into space, the better we will be.

Speaking for the Atlantic Missile Range, I would like to extend our thanks for the range officers, Pan American and RCA, at the instrumentation sites who provided good support today.

GILRUTH: Thank you, Colonel.

Before I go to the astronauts and Dr. White for their statements, while I remember it, and while we are all enumerating all the members of this team, I don't want to forget the U.S. Weather Bureau which had a fine team on board here, and which is responsible for moving those clouds out of the cameras long enough for us to get this shot off.

Dr. White?

WHITE: I think we shouldn't also forget the medical support for both the medical care that is necessary and the briefing being provided by the allied services of the Department of Defense, and also from the U.S. Public Health Service. Again this is a good indication of the universal cooperation that you saw on such a project.

As far as our look at the project was concerned, we had an anxious moment, too, when they started talking about holds because this opened up an area that has been long debated, and we had little data to back up as to what the course would be. If you will recall, on Ham, we had a similar type of hold, and we stuck it out and Ham came through well.

The same question was asked by Mr. Williams today: "How about Alan; how is he doing?" He came through very well. We had no worry. He was cheerful, and I think I said earlier that I think he was the least nervous of the whole bunch, between the blockhouse and control center, during the hold. In fact, I am afraid we may lose a flight director if we don't stop doing things like this.

In spite of the fact that we did have some rise in temperature in the suit, he was able to maintain his own body temperature very comfortably. He stayed on top of the operation during the holds. I believe he demonstrated really good engineering test pilot background when he showed very little change in pulse, respiration, and all the other parameters during the launch.

He went through the G program. He called out his events clearly, crisply, right down the line, right on schedule. The radio link was very good and got better as we went along. He showed no difference in voice until the re-entry Gs. At that time he showed the usual kind of grunt or groan that is associated with this kind of work load.

He promptly returned to normal after the re-entry G was over and I think again there was a large sigh of relief on all people's hands in the control center.

As far as the weightless flight was concerned, he looked like he returned to almost the base flying data within the short time that he was there in weightless flight. So I feel as far as he was concerned this flight was a real eye-opener.

I believe we predicted that this would be a non-spectacular event, that we were confident that man would be able to do this, and I don't believe we got any surprises.

GILRUTH: Thank you very much.

Gordon Cooper, do you have any remarks you would like to make?

COOPER: I always seem to get hung at the end of a lot of good speeches.

GLENN: You are not the last.

COOPER: It certainly is a real privilege to be a member of the team today and to watch all the fine people at work, and all the extreme dedication and blood, sweat, and tears -- if I may steal a phrase from a noted gentleman -- that went into this today.

There were a few complex moments when things didn't go exactly right. I am sure that those of us in support were probably more perturbed and sweating it out more than Al was.

I would like to say again that we had a lot of real fine supporting organizations and it is really a matter of teamwork. Nobody gets along so well as one organization.

GILRUTH: Thank you, Gordon.

Gordon was in the blockhouse for the operation.

Now I would like to turn to John Glenn.

GLENN: Last and least, I am sure I speak for "Coop" and myself both in backing up Admiral Hilles' statement. As far as we are concerned, after seeing this today I think you can just leave the ships out there, and if they have had two hours off on the pad, give them another setup.

I think it might be of some interest to know what we looked for in our specific positions this morning in checking out how Al was making out. My spot this morning during the actual launch, after having been down on the pad and in the capsule during the first early parts of the count this morning, was to be in here behind the capsule communicator's position, which was "Deak" Slayton this morning, and observe the launch from that spot, backing him up for any information that might be needed, since I had worked very closely with Al during all the final phases of the preparation of the capsule here.

From that position during the period before the launch, in keeping track of what Al was doing and how he was making out, we naturally did a lot of peering over Stan Shite's shoulder here to see how Al was doing, just straight biomedically-wise, because there was very little else to watch at that time, and we could keep the best tab on his condition by that method.

After the launch, however, the things I looked for in trying to determine how the flight was going and how Al was making out, I had a little card that was a duplicate of the one that we had in the capsule, giving event times as they occurred, with all the sequence panel items. I used that card then to check against not only what he was saying, what was coming through the headset, but also in observing the telemetry data that was coming in and being displayed on a large chart right in front of our position, in the systems position, that gave the roll, pitch, and yaw attitudes of the capsule -- attitudes and rates of roll, pitch, and yaw of the capsule.

If you can listen to him talk and can have the card so that you know exactly what he was doing, by watching the rates and the attitudes at the same time, you know exactly what is going on and exactly what attitude the capsule is in and whether the flight was progressing in a completely normal fashion, which it did, I am happy to say.

Needless to say, we are looking forward to future flights here. All I can add is that I hope they all go as smoothly as this one did today. It was an excellent flight. There are only so many ways that you can say it was a good flight, I guess, but it certainly was.

Thank you.

GILRUTH: Thank you, John.

Now I will turn back to Jack King.

KING: Thank you, gentlemen.

We would now like to have questions from you. If you would, please raise your hand and ask the question. We will repeat the question for the benefit of everyone.

QUESTION: How far off his attitude was he when he fired the retrorockets? Within how many degrees was he from the angle at which the retrorockets should have been pointed when he fired them?

GILRUTH: The quick-look data indicates that he never got out of the five-degree deviation from the nominal atitude, which is holding it very well.

QUESTION: Doctor, when did the space craft break away from the Redstone?

GLENN: Two minutes and twenty-three seconds. It was right on schedule. This is at about 196,000 feet.

QUESTION: On the speed, was it unusual?

KING: The speed had been estimated at 4500 miles an hour. The announced speed was 5100 miles an hour.

One is inertial velocity and the other is the velocity relative to the earth.

QUESTION: Which is which?

GILRUTH: The high one is the inertial.

KING: 5100 is the inertial and 4500 is the velocity relative to the earth.

QUESTION: What is inertial velocity relative to?

DRYDEN: The solar system.

QUESTION: Colonel Glenn mentioned a card in the capsule. Can you tell us where it was placed and what it might look like? Is it an index card, 3 x 5. He also carried a clipboard of some kind with papers into the capsule.

GLENN: The card I mentioned was similar to a 3 x 5 card, a little bit longer than that, narrow, and fit into the instruments a little to the right of center on the panel and to the right of the clock which was his reference every time he wanted to refer to this card anyhow. I doubt whether there was much reference to the card. We have been through this thing enough times that we have that card pretty well down cold. We put the card in as a back-up measure only.

QUESTION: Were there any other papers or documents along, charts of any kind?

GLENN: In the map case we had a tentative weather map that we were briefed on this morning, and also a map of the Bahama Islands area to use for pinning down the area that he was going over. As far as being able to visually refer to a certain island or island chain we had the emergency procedure card in case there was any forgetting or a moment of confusion in which he might want to refer to a card for any emergency procedures. I am sure these were not necessary this morning either, but they were in the map case.

QUESTION: What was the maximum altitude?

GILRUTH: 115 miles.

QUESTION: Dr. Gilruth, are the other Astronauts going to follow in suborbital flights before an orbital flight is attempted?

GILRUTH: It is planned that there will be more sub-orbital flights before the orbital flight, right.

QUESTION: Could you estimate when?

GILRUTH: I would rather not pinpoint any dates right now.

QUESTION: Can we be told the maximum heat recorded on re-entry?

WILLIAMS: This was on tape. We don't monitor it in real time. Actually the cabin and suit circuits, from that standpoint, the temperature rise was of the order of five degrees. The cabin was something like 95 or so on the ground and rose to 101 or 102. The suit circuit was 72 and went to 75.

So it was hardly noticeable. We will have data on the heating. This is all on tape.

QUESTION: Would you tell us please, how soon Commander Shepard will be taken to Washington?

GILRUTH: No, I can't say that I know the exact time.

QUESTION: Will it be Saturday?

GILRUTH: He is due to be held at the medical station until sometime tomorrow. The exact timing of when he goes to Washington I don't think any of us know, unless Hugh knows.

DRYDEN: Not earlier than 24 hours, and hopefully before 48. That is all I can tell you right now.

QUESTION: Dr. Gilruth, can you give us some of the specifics as to why Commander Shepard was selected to make this flight?

GILRUTH: I think I made a statement as to the basis for the Astronaut selection at the time the group of three was announced. It was the same basic data that formed the background for the choice of Commander Shepard. This is medical, physical, proficiency and all this sort of thing.

QUESTION: What object could he pick out on the ground when he went to high magnification and how high was that vapor trail that we saw?

GILRUTH: All I can tell is what I heard over the tape which you will hear shortly, of his transmission over the radio. I recall hearing him say the extent of the cloud cover, that it was a beautiful sight. He mentioned something about Hatteras. He apparently had a very wide view of the East Coast from the height at which he was flying. I think any more detail than what is on the tape will have to wait until we have a chance to talk with Alan.

GLENN: I might make one comment on that. We had a number of land marks in this whole coastal area clear up to Cape Hatteras and south clear down to the Coast. All over this whole area we had picked out land marks.

In first, second and third order type landmarks in the way in which we thought they would stand out from altitude so that we would have a means of judging whether he could pick up only the big ones, middle sized ones and small ones. He was reading off a number of those or was seeing a number of those that we had briefed ourselves on before the flight.

Exactly which ones we will come up with off the tape I don't know yet, because of a lot of interference on the radio when he was reading those.

QUESTION: What were the manual operations he performed?

GLENN: Manual control of the capsule. We took over control of the capsule one axis at a time, pitch, yaw and roll, in that order, taking over in pitch control first, then adding another axis to it, taking over in yaw, and adding a third axis to it so that you wound up getting into this thing in a little gradual fashion, and winding up with full manual control.

He controlled it at different attitudes, controlled it throughout retrofire maneuver which is the most critical, of course, and maintained the attitude of the capsule very well.

These were the main manual control functions.

QUESTION: Was it through 35 degrees?

GLENN: We went to the five degree positions that the capsule would go to, as laid out, and he did go to those positions.

QUESTION: I believe you said, Admiral Hilles, that it was just seven miles off the predicted impact area at about 297 miles. We heard earlier it was 302 miles.

HILLES: I won't argue over the figures. His are probably better than mine. This is the estimate that I got just before I came over here, on our first clock. When I say it was seven miles over predicted, this was predicted of course months ago, based on the flight profile. And so it is quite an amazing thing, based on certain conditions, with changes of course, with the flight as close as it was.

QUESTION: What is the official figure that they have, if there is any other figure from instrumentation?

KING: The figure we have is 302 statute miles.

HILLES: Somebody's slipstick is better than mine.

KING: We apologize for that little business of a couple of miles. We will do better next time.

QUESTION: Did the Astronaut make any astronomical observations? Did he take any pictures? And tell us what the hold was at 2:40?

KING: Did the Astronaut make any astronomical observations and did he take any pictures and what was the hold at 2:40? I think we have two or three in there.

GILRUTH: I don't know. He very probably looked at the sky.

GLENN: We had a time period set in for that. We don't have a report on that back directly. Some of the radio communication about the time period when we were planning to make those observations was a little garbled and on the mob circuit in here there was some interference, so I did not hear any direct observations. We did have a time period set for that. We will have to get that when we talk to Al.

QUESTION: And pictures?

DEBUS: The hold at 2:40 was caused by the blockhouse indication that the pressure regulator that regulates inside the space vehicle, high pressure to the control pressure, overshot the control pressure by some 100 psi. If this would have been a setting change, then we would have had to call a scrub. But the blockhouse operator relieved that pressure by operating fuel valves and the pressure regulator settled down to its normal setting. This was found satisfactory so we proceeded.

QUESTION: Could you say, please, whether taking part in a flight like this is an indication or a contra-indication to taking part in an orbital one? Would a man who had done this feat have a chance for a later orbital flight?

GILRUTH: We regarded these Redstone flights as having two purposes. Of course the checkout and qualification of the space vehicle itself and its compatibility with the pilots. There also is a need for pilot training and qualification.

We have regarded them as being important before the orbital flight. Just how important these are as training missions we won't know until we have a chance to go into the results of the flight, until we have a chance to talk with the pilots after they have made them, and determine just how valuable a training procedure the suborbital flight is.

QUESTION: Over a period of years I have seen Dr. von Braun and Dr. Debus here, and I know they have been associated with this program for many years and space has been a long cherished dream of theirs. I would like to ask the two of them how they feel today and also what they feel would be the goals in space that could be possibly realized by Americans within the next five to ten years.

KING: The question is directed to Dr. von Braun and Dr. Debus on how they feel especially today and how they feel about the goals of the United States' progress in the next five years.

VON BRAUN: I have always felt that men belonged in outer space, and for this reason our launching today was a great personal satisfaction for me.

I think it will be only a humble beginning of much greater things to come. I think we can see the outlines quite clearly. After the suborbital flights there will be orbital flights with the same Mercury capsule but launched by an Atlas ICBM. And thereafter will come even larger space craft accommodating an entire crew of astronauts, a multiple crew. Such a capsule is already under design studies today and it will be launched with the Saturn rocket which we are presently developing at NASA. At this time it looks like manned flights with this much largercapsule can be expected by the end of '64 or early '65.

KING: If I may bring up one point here. Several of these gentlemen have to catch airplanes. Dr. Dryden's plane I believe is waiting. If we could start a few wind-up questions, I am afraid we are going to have to wind up this conference so these gentlemen can depart.

QUESTION: I never did get the question answered on pictures.

Did he take any pictures?

GILRUTH: Did he have a personal camera with him?

GLENN: Not a personal camera. We had what we call an earth-sky camera and pilot instrument panel pictures and pictures of him from within the capsule. But none of the ones taken outside personally by him, no.

QUESTION: Can Dr. Debus give us the name of the man who actually pushed the button which launched this?

QUESTION: The final sequence switch.

DEBUS: I have said many times before, there is no such thing. There is a sequencer that gets started. Once the sequencer has started the missile sequence is fully automatic. It can be interrupted at any time, but I do not think it is proper to identify any single individual for getting the sequencer started.

KING: Ladies and gentlemen, I am afraid we are going to have to wind this up. I will take one more question.

QUESTION: My editor insists on knowing if Alan Shepard had any particular insurance on this flight?

KING: The question is, did Alan Shepard have any particular insurance for this flight?

GILRUTH: I don't know as I am really very well up on this. I know as a military individual, an officer in the Navy has standard insurance. I know he carries a NASA standard insurance policy. What other personal insurances he has beyond this I don't know.

QUESTION: What is the standard NASA policy and would it cover a light of this sort?

GILRUTH: Yes.

QUESTION: What is the standard policy?

GILRUTH: It depends on your wage to some degree. It covers all activities of Joe Walker and people who test fly airplanes.

QUESTION: Up to what amount does it go?

GILRUTH: Ten or fifteen thousand, something of that order.

VON BRAUN: It is a year's pay, isn't it?

KING: Ladies and gentlemen, I am afraid we are going to have to call the conference at this time so these gentlemen can get to their planes.

QUESTION: How about Mrs. Shepard? Did she watch the flight on TV?

QUESTION: And the children?

QUESTION: Has he telephoned her?

WILLIAMS: Colonel Powers phoned her immediately after the flight and gave her the results. Of course she had been watching. He also called her during the hold, during the long hold, reporting that he was doing well, and he seemed to be the least concerned of any of us. He apparently was standing by quite well.

KING: Admiral, can you give us anything on latitude and longitude? Several people have asked questions on that.

HILLES: I don't have it with me but we can get it very quickly at will.

KING: We will announce it to you.

Thank you very much, ladies and gentlemen.

QUESTION: When will we get the tape?

KING: We are still waiting for the tape. I believe we will be able to have it here in a short time and we will play it here over the public address system for all of you.

Thank you.

(12:31 p.m.)

CAPE CANAVERAL, FLORIDA May 5, 1961

TRANSCRIPT OF COMMUNICATIONS WITH FREEDOM VII

VOICE: One minute and counting, mark.

Forty-five and counting, mark.

SHEPARD: Roger.

VOICE: Firing command, 30, mark.

SHEPARD: Roger. Periscope has retracted.

VOICE: That is the best periscope we've got.

SHEPARD: Main buss 24 volts, 26 amps.

VOICE: 15, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, zero.

Lift off.

SHEPARD: Roger, lift off and the clock is started.

VOICE: . . .

SHEPARD: Roger, reading you loud and clear.

VOICE: . . .

SHEPARD: This is Freedom VII, the fuel is going, 1.2 G, cabin at 14 psi, oxygen is go.

VOICE: . . .

SHEPARD: Freedom VII, it is still go.

VOICE: . . .

SHEPARD: This is VII, fuel is go, 1.8 G, 8 psi cabin, and the oxygen is go.

VOICE: . . .

SHEPARD: Cabin pressure is holding at 5.5. Cabin holding at 5.5.

VOICE: I can understand; cabin holding at 5.5.

SHEPARD: Fuel is go, 2.5 G. Cabin 5.5. Oxygen is go. The main buss is 24, and the isolator battery is 29.

VOICE: . . .

SHEPARD: O.K. It is a lot smoother now. A lot smoother.

VOICE: Roger.

SHEPARD: . . . fuel is go, 4 G, 5.5 cabin. Oxygen. All systems are go.

VOICE: All systems go. Projected out O.K.

SHEPARD: 5 G. CAP SEP (Capsule separator) green.

VOICE: Roger.

SHEPARD: Disarm. CAP SEP is green.

VOICE: CAP SEP comes up.

SHEPARD: CAP SEP is coming out; and the turn around has started.

VOICE: Roger.

SHEPARD: SCS. No movements.

VOICE: Roger.

SHEPARD: O.K. Switching to manual pitch.

VOICE: Manual pitch.

SHEPARD: Pitch is O.K. Switching to manual yaw.

VOICE: I understand. Manual yaw.

SHEPARD: Yaw is O.K. Switching manual roll.

VOICE: Manual roll.

SHEPARD: Roll is O.K.

VOICE: Roll O.K. Looks good here.

SHEPARD: On the periscope. What a beautiful view.

VOICE: I'll bet it is.

SHEPARD: Cloud cover over Florida, three to four tenths in the Eastern Coast, obscured up through Hatteras. Can see Okeechobee, identified Andrus Island, identified the reefs.

VOICE: Roger. Down to retro: 5, 4, 3, 2, 1, retro-angle.

SHEPARD: Tried retro sequence. In retro attitude. Are green.

VOICE: Roger.

SHEPARD: Control is smooth.

VOICE: Roger, understand, all going smooth.

SHEPARD: Retro 1, very smooth.

VOICE: Roger, Roger.

Retro 2.

SHEPARD: Retro 3. All three retros are fired.

VOICE: All red on the button.

SHEPARD: O.K., three retros fired. Retro jetison is back to arm.

VOICE: Roger. Do you see the booster?

SHEPARD: Negative.

VOICE: Roger. Switching fly by wire.

Fly by wire. Understand.

SHEPARD: All is O.K.

VOICE: Roger. . . . .

SHEPARD: Roger. I do not have a light.

VOICE: Understand you do not have a light.

SHEPARD: I do not have a light. I see the straps falling away. I heard a noise. I will use override.

VOICE: Roger.

SHEPARD: Override used. The light is green.

VOICE: . . . retrojet.

SHEPARD: Roger.

Periscope is retracting.

VOICE: Periscope retracting.

SHEPARD: . . . going into re-entry attitude.

VOICE: Re-entry attitude. Roger.

Projector is right on the button.

SHEPARD: O.K., Buster. Re-entry attitude. Switching to SCS normal.

VOICE: Roger.

SHEPARD: SCS is O.K.

VOICE: Understand.

SHEPARD: Switching to HF for radio check.

VOICE: . . . on UHF.

Back to UHF.

SHEPARD: All clear. This is Freedom VII.

VOICE: . . .

SHEPARD: 4, 3, 6, 9. O.K. O.K.

VOICE: Coming through loud and clear.

SHEPARD: O.K. O.K.

VOICE: . . . CapCom (Capsule Communicator), your impact will be right on the button.

SHEPARD: 30,000 feet.

VOICE: CapCom, I can read now.

SHEPARD: Loud and clear. 25,000.

VOICE: Switching over to GBI.

SHEPARD: Roger.

The drog is going at 21, the periscope is out.

The drog -- the drog -- the drog is -- blowing at seven zero percent auto, nine zero percent manual, oxygen is still O.K.

VOICE: CapCom, can you read?

SHEPARD: Thirty-five sixty seconds.

VOICE: CapCom, can you read?

SHEPARD: I read.

VOICE: CapCom, how do you read now?

SHEPARD: . . .

CapCom, glad to be here aboard. I am at 7,000 feet. The . . . is good. . . .

My position is good.

VOICE: Roger. . . .

SHEPARD: . . . Altitude 4,000 feet. Condition as before. . . . feels good. Will land. . .

VOICE: CapCom, this is CapCom two three.

SHEPARD: This is . . ., CapCom.

VOICE: This is two three, over.

SHEPARD: . . . will you please relay. Need information.

VOICE: Freedom VII reports good drog, . . . deployed, 7,000 feet. . . .

SHEPARD: All O.K.

VOICE: CapCom two zero seven seven. . .

SHEPARD: CapCom, point three . . . everything AOK. Over. . . .

Dye marker out.

VOICE: Coming along side now.

SHEPARD: CapCom is alongside. . . now. Over.

VOICE: Astronaut now on board.

+ + +

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

SCHEDULE OF EVENTS
May 8, 1961

9:40 a.m.	Arrival of Astronaut Alan B. Shepard at Andrews Air Force Base.
9:45 a.m.	Official party leaves by helicopter for White House South Lawn.
10:00 a.m.	Shepard and official party greeted by President and Mrs. John F. Kennedy. Ceremonies begin.
11:15 a.m.	Official party leaves White House Southwest Gate in six-car motorcade, proceeds via State Place, 17th Street, Pennsylvania Avenue, 15th Street, Pennsylvania Avenue and Constitution Avenue to Capitol, and enters through Senate portico.
11:30 a.m.	Congressional reception for Astronaut Shepard in Old Supreme Court Chamber.
12:30 p.m.	Official party departs Capitol for New State Department, 22nd and E Sts., N. W., via Constitution Avenue.
1:00 p.m.	News Conference for Astronaut Alan B. Shepard begins.
2:00 p.m.	Official luncheon for Astronaut Shepard, given by NASA Administrator James E. Webb and Mrs. Webb, at Green Room, State Department Building.
3:30 p.m.	Official party departs for Andrews Air Force Base.
4:00 p.m.	Official party departs Andrews Air Force Base by aircraft.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GUEST LIST FOR LUNCHEON
Green Room, New State Department
May 8, 1961 - 2:00 p.m.

Host - Administrator James E. Webb and Mrs. Webb

Astronauts and Members of Cdr. Shepard's Family

Cdr. and Mrs. Alan B. Shepard, Jr.
Col. and Mrs. Alan B. Shepard, East Derry, N.H.
(Parents of Cdr. Shepard)
Lt. Col. John H. Glenn, Jr., USMC
Capt. Virgil I. Grissom, USAF
Lt.Cdr. Malcolm S. Carpenter, USN
Capt. Leroy G. Cooper, Jr., USAF
Lt.Cdr. Walter M. Shirra, Jr., USN
Maj. Donald K. Slayton, USAF
Mrs. Gordon Sherman, North Attleboro, Mass.
(Cdr. Shepard's sister)
Mr. and Mrs. R. P. Brewer, Kennett Square, Penna.
(Parents of Mrs. Alan B. Shepard, Jr.)

National Aeronautics and Space Council

Vice President and Mrs. Lyndon B. Johnson
Under Secretary of State, Chester Bowles
(Representing the Secretary of State)
Secretary of the Navy, John B. Connally
(Representing the Secretary of Defense)
Commissioner John S. Graham, U.S. Atomic Energy Commission
(Representing the Chairman, U.S. Atomic Energy Commission)
Dr. Edward C. Welsh, Executive Secretary of the National Aeronautics and Space Council

Special Assistant to the President for Science and Technology

Dr. Jerome B. Wiesner

Congress

Senator Robert S. Kerr, Chairman, Senate Committee on Aeronautical and Space Sciences
Congressman Overton Brooks, Chairman, House Committee on Science and Astronautics
Senator Styles Bridges, Member, Senate Committee on Aeronautical and Space Sciences
Congressman Joseph W. Martin, Jr., Member, House Committee on Science and Astronautics

NASA

Dr. Robert C. Seamans, Jr., Associate Administrator
Dr. Abe Silverstein, Director, Office of Space Flight Programs
Maj.Gen. Don R. Ostrander, Director, Office of Launch Vehicle Programs
Dr. Charles H. Roadman, Acting Director, Office of Life Science Programs
Mr. Robert R. Gilruth, Director, Space Task Group
Mr. Walter C. Williams, Associate Director for Operations, Space Task Group
Dr. William K. Douglas, Physician to the Astronauts
Mr. John A. Powers, Public Affairs Officer, Space Task Group

FOR RELEASE UPON PRESENTATION
Expected 10:30 a.m.

Statement of
Mr. James E. Webb — bi.
Administrator
National Aeronautics and Space Administration
Before the
Committee on Aeronautical and Space Sciences
United States Senate
May 16, 1961

Mr. Chairman and Members of the Committee:

The complete legislative program recommended by NASA for the current year, except for the annual authorization and appropriation bills, is included in the bill which is before the Committee, S.1857.

The purposes sought through S.1857 are:

1. Repeal of the statutory requirement for a Civilian-Military Liaison Committee.

2. A grant to NASA of statutory authority to indemnify contractors against unusual hazards, to settle patent infringement claims, to waive performance and payment bonds in cost-type construction contracts, and to lease government property for a nonmonetary consideration, similar to the authority presently vested in the military departments.

3. Clarification of existing law.

Elimination of the Civilian-Military Liaison Committee

Section 1(b) of S.1857 would repeal section 204 of the National Aeronautics and Space Act of 1958, thereby eliminating the Civilian-Military Liaison Committee. The effective functioning of the Aeronautics and Astronautics Coordinating Board removes any need for the Liaison Committee.

Section 204 of the 1958 Act provides for a Committee to be headed by a Chairman appointed by the President and with additional members representing the Department of Defense and the military departments on the one hand and NASA on the other. Under the law, the Chairman is not an official of either NASA or the Department of Defense and has no duty other than to chair the Committee. The only statutory function assigned to the Committee is to provide a channel for advice, consultation, and the exchange of information between NASA and the Department of Defense. No planning, operating, or supervisory responsibilities have been vested in the Committee or its Chairman.

Experience has led both NASA and the Department of Defense to conclude that such an organization is not the most effective means of achieving coordination of their respective programs and activities. After much consideration of the problem by both agencies, we have established, by joint action, an Aeronautics and Astronautics Coordinating Board which is performing a number of valuable functions, including all of the functions originally entrusted to the Civilian-Military Liaison Committee.

The Aeronautics and Astronautics Coordinating Board has proved more effective than the Liaison Committee because it is co-chaired by the Deputy Administrator of NASA and the Director of Defense Research and Engineering of the Department of Defense and has additional members appointed jointly by the Administrator of NASA and the Department of Defense. By its terms of reference, the Board is responsible for facilitating (1) the planning of activities by NASA and the Department of Defense to avoid undesirable duplication and to achieve efficient utilization of available resources; (2) the coordination of activities in areas of common interest to NASA and the Department of Defense; (3) the identification of problems requiring solution by either NASA or the Department of Defense; and (4) the exchange of information between NASA and the Department of Defense. The Board carries out its functions largely through panels chaired by top management personnel of NASA and the Department of Defense. At present, panels have been established for the following areas: (1) manned space flight; (2) spacecraft; (3) launch vehicles; (4) space flight ground environment; (5) supporting space research and technology; and (6) aeronautics.

Existing legal authority has been found adequate for the establishment of the Aeronautics and Astronautics Coordinating Board by administrative means, and specific statutory authorization is not desired. The Secretary of Defense and I are in close personal touch on inter-agency issues, and we meet frequently. It is important that we retain maximum flexibility to establish whatever means prove most useful to effect prompt decisions as well as thoroughgoing coordination and liaison at all levels of our organizations.

Additional Legal Authority for NASA

The most important grant of additional legal authority to NASA is found in section 1(e) of S.1857. This subsection would add a new section 308 to the 1958 Act captioned, "Indemnification." It would provide NASA with authority identical to that presently available to the military departments under 10 U.S.C. 2354 to indemnify contractors against risks defined in the contract as unusually hazardous.

NASA requires this indemnification authority for the same reasons that it was given to the military. For example, in the development of advanced methods of propulsion, NASA contractors and subcontractors may be confronted with risks of such a magnitude that they cannot be covered by available insurance or, if coverage is available, at anything like normal insurance rates. Such unusually hazardous risks either must be borne in large part by industry or be covered by insurance at rates that are so high as to result in prohibitive costs being charged to the Government under these contracts, since, without express statutory authority, NASA cannot indemnify its contractors to cover adequately these kinds of risks. This lack of authority poses a serious problem for NASA which can only grow more intense as research and development into propulsion methods, fuels, launch vehicles, and similar work continues into the future. Moreover, in fields where both NASA and the military are placing large contracts, ordinarily with the same industry, this difference in legal authority between NASA and the military departments creates difficulties and misunderstanding.

In three other areas, we are requesting legal authority comparable to that which the Congress has already seen fit to vest in the military departments.

Section 2 of S.1857 would amend the so-called "Miller Act" (40 U.S.C. 270a-270e) to provide NASA with authority, in the case of cost-type construction contracts, to waive performance and payment bonds otherwise required of Government contractors on such work. The proposed amendment would give NASA authority to waive these bonds which is identical to that of the military departments and the Coast Guard under 40 U.S.C. 270e. This requested authority would have been useful, for example, in a cost-type contract that NASA made with a large responsible company calling for the construction of tracking facilities. Whereas a military department would have been able to waive performance and payment bonds under such a contract due to the express statutory authority available to it, NASA could not. In this case, the financial responsibility of the contractor and the form of contract involved would have assured ample protection for the laborers and materialmen who were intended to be protected by the Miller Act. Thus, if the requested authority had been available to NASA, the Government would have saved a sizeable sum that would appear to have been a needless expense under the circumstances. Repetitions of this situation may be expected.

Section 1(a)(i) of S.1857 would amend section 203(b) of the 1958 Act to provide NASA with greater flexibility in the leasing of government property under its jurisdiction. Unlike the military departments, NASA is presently required by law to make leases of government property "for a money consideration only" (40 U.S.C. 303b). Instances have arisen where it would have been advantageous to the Government for NASA to have leased property for a use which would not interfere with NASA's mission in return for the rendering of certain valuable services by the lessee in connection with the leased property. The proposed use of the property by the lessee, however, would have made it uneconomical to pay a money consideration for its use, although the service to be performed by the lessee would have resulted in a net benefit to the Government. The proposed amendment follows the language of 10 U.S.C. 2667(b)(5) and would give NASA the authority now enjoyed by the military departments under that statutory provision to permit the lessee to undertake the maintenance, protection, repair, or restoration of the leased property as part or all of the consideration for the lease.

Section 1(a)(ii) of the bill would amend section 203(b) of the 1958 Act by adding a new paragraph granting NASA authority to settle claims against the Government for past infringement of patents arising out of its activities. The military departments now enjoy the authority to settle such claims without imposing upon the claimant the necessity of litigation (10 U.S.C. 2386). NASA has no comparable authority. Section 203(b)(3) of the 1958 Act, authorizing the purchase of patent rights, cannot be utilized by NASA to effect a settlement for past infringement of a patent if no subsequent use of the patent is contemplated. Since its mission traverses a broad spectrum of technology involving innumerable areas in which patents are held by private parties, it is inevitable that claims for patent infringement will be asserted against NASA; and it is most desirable that NASA have adequate authority to settle such claims administratively. The proposed amendment would provide authority identical to that presently available to the military departments.

Clarifying Amendments

Section 1(d) of S.1857 would amend section 304(b) of the 1958 Act to correct what appears to have been an unintentional omission. The proposed amendment adds the phrase "or designee thereof" after the reference to "the Administrator" in connection with authorizing access to Restricted Data relating to aeronautical and space activities on condition that such access is required in the performance of duty and so certified by the Administrator. The making of these certifications is a function which, in the interest of efficient administration, should be delegable by the Administrator.

Section 3 of the bill would amend 10 U.S.C. 2302 to make it clear that the Deputy Administrator of NASA, like the Under Secretaries and Assistant Secretaries of the military departments, may perform certain nondelegable procurement functions under chapter 137 of Title 10. 10 U.S.C. 2311 requires that certain determinations and decisions involved in the procurement process be performed by the "head of an agency." At present, only the Administrator of NASA is specifically mentioned in the definition of "head of an agency" in 10 U.S.C. 2302. NASA has construed section 202(b) of the 1958 Act, which provides that the Deputy Administrator "shall perform such duties and exercise such powers as the Administrator may prescribe," as authorizing performance by the Deputy Administrator of any function vested by law in the Administrator, including functions which may not legally be delegated to subordinate personnel. Although this authority appears broad enough to include the performance by the Deputy Administrator of nondelegable functions under chapter 137 of Title 10, it would be desirable to remove all doubt by amending the definition of "head of an agency" in 10 U.S.C. 2302 to include the Deputy Administrator. Such an amendment would eliminate any possible misunderstanding of the Deputy Administrator's authority by contractors dealing with NASA.

Section 1(c) of the bill would amend section 206(a) of the 1958 Act to require that NASA submit an annual report, in place of the present semiannual one, to the President for transmittal to the Congress. Enactment of this amendment would reduce expenditures slightly; but more importantly, it would provide Congress with a more meaningful report once a year. The present semiannual reports take a considerable amount of time and manpower to prepare and cover too short a period to reflect significant advances.

No. 61-10

Canney

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: May 17, 1961

RELEASE NO. 61-103

INTERNATIONAL
SATELLITE AND SPACE PROBE SUMMARY

The following space vehicles are in orbit as of this date:

NAME/COUNTRY	LAUNCH DATE	TRANSMITTING
Explorer I (US)	Jan. 31, 1958	No
Vanguard I (US)	Mar. 17, 1958	Yes
*Lunik I (USSR)	Jan. 2, 1959	No
Vanguard II (US)	Feb. 17, 1959	No
*Pioneer IV (US)	Mar. 3, 1959	No
Explorer VI (US)	Aug. 7, 1959	No
Vanguard III (US)	Sep. 18, 1959	No
Explorer VII (US)	Oct. 13, 1959	Yes
*Pioneer V (US)	Mar. 11, 1960	No
Tiros I (US)	Apr. 1, 1960	Yes
Transit I-B (US)	Apr. 13, 1960	No
Spacecraft I (USSR)	May 15, 1960	No
Midas II (US)	May 24, 1960	Yes
Transit II-A (US)	June 22, 1960	Yes
NRL Satellite (US)	June 22, 1960	No
Echo I (US)	Aug. 12, 1960	No
Courier I-B (US)	Oct. 4, 1960	Yes
Explorer VIII (US)	Nov. 3, 1960	No
Tiros II (US)	Nov. 23, 1960	Yes
Samos II (US)	Jan. 31, 1961	No
*Venus probe (USSR)	Feb. 12, 1961	No
Explorer IX (US)	Feb. 16, 1961	No
Discoverer XX (US)	Feb. 17, 1961	No
Discoverer XXI (US)	Feb. 18, 1961	No
Explorer X (US)	Mar. 25, 1961	No
Discoverer XXIII (US)	Apr. 8, 1961	No
Explorer XI (US)	Apr. 27, 1961	Yes

*In solar orbit; others in Earth orbit.

CURRENT SUMMARY (May 17, 1961)

Earth Orbit:	US	- 22
	USSR	- 1
Solar Orbit:	US	- 2
	USSR	- 2
Transmitting:	US	- 8
	USSR	- 0

COMPLETE SUMMARY (Launched to date)

Earth Orbit:	US	- 39
	USSR	- *12
Solar Orbit:	US	- 2
	USSR	- 2
Lunar Impact:	USSR	- 1

*Lunik III passed once around Moon, then into Earth orbit.

Chron.

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: Sunday AM's
May 21, 1961

RELEASE NO. 61-104

Rocket failure prevented orbit 5/24/61

NASA WILL LAUNCH IONOSPHERE BEACON SATELLITE (S-45)

A second attempt will soon be made by NASA to launch from Cape Canaveral an ionosphere beacon satellite (S-45) on the last of the JUNO II rocket series.

Nearly forty universities and government laboratories in many parts of the world are participating in this experiment, intending to find out more about the shape of the ionosphere -- where there are concentrations of electrons, where the ionosphere's profile has peaks or valleys in its structure.

So far, too little is known about the ionosphere, which is the ionized portion of the earth's upper atmosphere. The ionosphere extends from 30 to many thousands of miles about the earth. Lack of this knowledge is costly in practical applications, such as long-range communications, which depend upon reliably bouncing signals off ionosphere layers.

The new payload being prepared for orbit is called the Ionosphere Beacon Satellite S-45a. It looks very much like Explorer VII and Explorer VIII, two truncated cones back to back. The S-45a, however, has a 6-foot loop antenna around its equator to transmit its lower frequency signals to ground stations.

Unlike Explorer VIII, this 75-pound satellite will not be an experiment in itself. Explorer VIII carried instrumentation for direct measurements of the positive ion and electron concentrations in its orbital path around the earth. The new satellite will transmit on six frequencies (approximately 20 mc, 40 mc, 41 mc, 108 mc, 360 mc and 960 mc). Ground stations receiving these signals will analyze them by various methods such as change in polarization and Doppler shift to determine characteristics of the ionosphere. The satellite is expected to orbit the earth every 115 minutes with an apogee of about 1,600 miles and a perigee of about 240 miles.

The Ionosphere

Until the beginning of space exploration, very little indeed was known about the ionosphere. Until the advent of radio broadcasting, a generation ago, no one had seriously investigated the ionosphere at all. Since measurements were necessarily made from the ground, much ionospheric theory developed before the age of rocketry has since proven to be erroneous.

United States rocketry has produced a tremendous amount of data about the ionosphere. Many miles of magnetic tape have been analyzed to date. This has resulted in findings that have led to better methods in ionospheric research. Yet the surface of space, so to speak, has scarcely been scratched. When the object is to map the whole ionosphere, its content from region to region about the earth, and its profile for hundreds of miles into space, there must be a great deal of research.

Rocket measurements have revealed the cause of radio blackouts in high latitudes and crude means of predicting them have been devised. These flights have brought about an explanation for the inexactness of previous methods for predicting maximum usable frequencies for long-range communications circuits.

Rocket-gathered data have revealed serious errors made in the past in the interpretation of data obtained by ground stations. This has stimulated the development of more accurate analysis of these data by modern electronic computers.

Experiments must continue where unexplainable phenomena are revealed. A good example is a costly NASA tracking station at Lima, Peru, which has been operating on a frequency of 108 megacycles. At times, the signals fluctuate and this station cannot get accurate tracking data. At another station at East Grand Forks, Minn., signals vary greatly whenever satellites pass to the north after a severe disturbance on the sun.

There is so far no completely satisfactory explanation for these phenomena. When there is one, it appears, it will be the result of scientific investigations such as those conducted with the help of the Ionosphere Beacon Satellite.

New Zealand Experiment

One example of the benefits which may be expected from greater knowledge of the ionosphere relates to New Zealand. The two-island dominion is remote from Europe and America. Radio communications between these continents and New Zealand are vital, and unfortunately frequently beset with costly radio signal interference.

New Zealand's Seagrove Radio Research Station is one of the participants in the S-45 experiment. It is part of the Physics Department of the University of Auckland.

S-45 Program Participants

Others participating are: Pennsylvania State University, University Park, Pa.; University of Illinois, Urbana, Ill.; Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colo.; and Stanford University, Stanford, Calif.

A part-time observing site has been set up at Baker Lake, Canadian Northwest Territories by the University of Illinois. Stanford University has set up a station at the University of Hawaii. The Pennsylvania State University has established an equatorial recording station near the magnetic equator at Huancayo, Peru.

Coordination and data reduction is the responsibility of NASA's Goddard Space Flight Center. J. Carl Seddon is the Goddard manager. Tracking, after the initial "quick look," will also be a responsibility of Goddard through its world-wide Minitrack network.

The first "quick look" at data to determine whether the vehicle is performing well and whether the satellite is going into the desired orbit will be done by the NASA Marshall Space Flight Center.

The Marshall Center designed the payload, the first stage booster, and is responsible for the launch vehicle. Bill Greever is the Marshall manager.

The launch vehicle chosen for this experiment to be launched from Cape Canaveral is the Juno II, the 60-ton four-stage rocket used before in eight launch attempts, including the Pioneer III and Pioneer IV radiation space probes, the Explorer VII radiation satellite, the Explorer VIII ionosphere satellite, and the Explorer XI Gamma Ray Astronomy Satellite. Marshall designed the modified Jupiter first stage. The upper three stages were designed by the Jet Propulsion Laboratory.

If the S-45 goes successfully into orbit, it will be assigned an Explorer name and number to indicate that it has joined more than 40 other United States satellites which have contributed much to the world's knowledge of the space environment.

FACTS ABOUT THE IONOSPHERE BEACON SATELLITE (S-45)

The S-45 satellite configuration is similar to those of Explorer VII and VIII. It is in the form of two truncated cones, the bases of which are attached to a cylindrical band, or equator. The satellite structure is 30 inches in diameter, identical in this respect to the earlier payloads; the height is 24 inches, six inches less than formerly.

The outer shell is constructed of aluminum. The fourth stage motor case, after burnout, will separate from the satellite.

The instrumentation consists of the following items:

1. Transmitter -- A single transmitter is used to broadcast radio signals on six different frequencies at varying levels of power. This is the largest number of frequencies to be used by any satellite to date. The basic oscillator frequency is 1.000255 megacycles per second; the transmitting frequencies are six harmonics (multiples) of this basic crystal frequency, ranging from 20 to 960 megacycles. The radiated frequencies are as follows:

Harmonic	Frequency	Est. Transmitter Output	Est. Radiated Power
20	20.0051 mc	300 mw	160 mw
40	40.0102	100	40
41	41.01045	100	40
108	108.02754	20	20
360	360.0918	100	100
960	960.2448	10	10

By measuring at ground receiving stations the change in polarization or the Doppler shift of the signals, it will be possible to determine the ionosphere electron content between the station and the satellite.

The six frequencies are developed from a 1.000255 mc. quartz crystal oscillator. These frequencies are made to be extremely stable by a unique heat filter surrounding the crystal which eliminates alternating changes in the crystal temperature as the satellite passes from sunlight into earth's shadow. The transmitter is also unique in that it employs high-efficiency capacity diode harmonic generators and transistor amplifiers to obtain an overall power efficiency of 35 percent.

2. Telemetry and Power Supply --

a. Telemetering will be done on the 108 mc frequency. A total of 14 channels of information will be transmitted. They are: temperature, 7 channels; satellite aspect, 2; voltage of exposed solar cells, 2; voltage of main power supply, 1; calibration, 2.

b. The power supply will consist of both solar cells and nickel cadmium batteries to operate the payload continuously up to about 13 months, when an automatic timer is scheduled to cut off the transmitter to make the frequencies available for other purposes. Four packs of rechargeable ni-cad batteries are located at 90 degrees apart on the equator of the satellite. The solar cell arrangement, on both the lower and upper cones of the payload, covers a total of 4665.6 square centimeters (2592 cells). The solar cells are covered individually with a sheet of silicon glass, .0006 of an inch thick, to protect them from radiation. Nominal output of the main power supply is 15.4 volts.

c. Two additional patches of identical unprotected solar cells are mounted on the center band of the satellite in two planes 45 degrees apart and 22.5 degrees respectively from the tangent plane of the satellite equator. The patches consist of 10 cells wired in series with a total patch output of 3-1/2 volts. As the satellite orbits, the reduction of the voltage output will indicate the extent of damage to the uncovered cells due to radiation. Placed at 45 degree angles to each other, the patches will also double as an aspect sensor when the voltages of the two patches are compared to the known value which results from the sun's striking the surfaces at a 90 degree angle.

d. Aspect Sensor -- While the exposed solar cell patches (above) serve as a backup or spare indicator of satellite aspect, the payload incorporates a specific aspect sensor, that is, an instrument to determine the satellite's orientation with respect to sources of light. The aspect system, located on the payload's equator, uses two photodiodes, one sensitive to the sun's rays and the other to the earth's albedo, or reflected light.

e. Temperature -- Seven temperature sensors are included in the payload, in the following locations: Two on protected solar cells, one on exposed solar cell, one in a battery pack, two in the transmitter, and one on the equator of the satellite. Thus, four external or skin measurements and three internal measurements are provided.

f. Antenna -- Two antennas are installed on the satellite, both of which were developed by the Marshall Center, and are being used for the first time. A loop antenna, six feet in diameter, extends from the satellite equator soon after the fourth stage rocket case is separated. It is held in place by centrifugal force. The loop antenna radiates the 20, 40 and 41 mc frequencies. The second is a spike antenna, 19-3/4 inches in length, which is mounted in front of the satellite along the spin axis. The 108, 360 and 960 mc signals are transmitted from it.

g. Payload Weight -- The weight of the payload is as follows:

Ionosphere beacon antenna assembly	2.7 pounds
Upper cone assembly	11.1
Lower cone assembly	10.2
Center ring	12.7
Shell assembly	6.1
Instrument column	16.4
Separation device	3.0
Battery packs (four)	6.5
Wiring	2.7
Fasteners	3.0
Balance weights	.6
Total	75.0 pounds

S-45 TRACKING AND DATA ACQUISITION

The Goddard Space Flight Center World-Wide Minitrack System is responsible for tracking the Ionosphere Beacon Satellite S-45, using the 108 mc beacon frequency during its active life-time of approximately thirteen months. Minitrack stations located at Woomera, Australia; Johannesburg, South Africa; Santiago, Chile; Antofagasta, Chile; Lima, Peru; Quito, Ecuador; Antigua, British West Indies; San Diego, California; Ft. Myers, Florida; and Blossom Point, Maryland will participate using interferometer tracking techniques. The Winkfield, England and East Grand Forks, Minnesota Minitrack stations will be used for telemetry acquisition purposes only.

During the launch and early orbit phases (defined as extending from lift-off, through power flight, and for the first three satellite orbits) additional "quick look" tracking data will be supplied by the Marshall Space Flight Center Doppler Station, Huntsville, Alabama; the ARGMA Doppler Station, Redstone Arsenal, Alabama; The Marshall Space Flight Center Doppler Station at Cape Canaveral, Florida; the Goddard Space Flight Center Minitrack Station at Cape Canaveral, Florida; the Goddard Space Flight Center portable Doppler stations at Atlantic, North Carolina; Paynters Hill, Bermuda; and Van Buren Maine; the Goddard Space Flight Center Minitrack Stations at Blossom Point, Maryland; Johannesburg, South Africa; and Woomera, Australia; the Ballistics Research Laboratories Doppler Station at Aberdeen, Maryland; the Fort Monmouth, New Jersey Doppler Station; the Jet Propulsion Laboratory Doppler Station at Cape Irwin, California; the Massachusetts Institute of Technology Lincoln Laboratories Millstone Hill Radar Station at Westford, Massachusetts, and the Jodrell Bank, England, radio telescope.

The "quick look" tracking data obtained by the above stations will be transmitted as soon as possible via electrical means to the Marshall Space Flight Center where it will be quickly evaluated and used in determining the Juno II vehicle performance, injection parameters, and initial orbital elements. The "quick look" data will also be transmitted to Goddard Space Flight Center where it will be used, along with the Minitrack Direction Cosine Data, to determine a more precise set of orbital elements and to compute predicted tracking and telemetry station acquisition times.

The satellite will transmit six frequencies which will allow experimenters all over the earth to pursue ionospheric studies by ground based observation of the satellite signals.

The principal experimenters and their observing station locations are as listed below:

Mr. Fernandez de Mendonca
Radio Science Laboratory
Stanford University
Stanford, California

Dr. J. E. Titheridge
University of Auckland
Auckland, New Zealand

Mr. Robert S. Lawrence
National Bureau of Standards
Central Radio Propagation Laboratory
Boulder, Colorado

Dr. G. W. Swenson
Department of ElectricalEngineering
University of Illinois
Urbana, Illinois

Dr. W. J. Ross
The Ionosphere Research Laboratory
Pennsylvania State University
University Park, Pennsylvania

The University of Illinois, Pennsylvania State University, and Stanford University also have substations which are located in South America, Hawaii, and Canada.

It is the responsibility of each of the above experimenters to publish the results of his research in technical journals and/or scientific reports.

The 108 mc satellite beacon signal will be used for both tracking and for telemetering satellite aspect and environmental data. Telemetered data will be received by the Goddard Space Flight Center Minitrack Stations and the Marshall Space Flight Center Station at Huntsville, Alabama. This data will be analyzed by both Goddard and Marshall and the results forwarded to the participating experimenters for use in their respective research.

JUNO II FACT SHEET

1st Stage - Modified Jupiter. Booster section and propellant tanks extended three feet to gain 20 seconds burning time. Fuel - LOX and kerosene. Modification by Marshall SFC. Engine built by Rocketdyne Division of North American Aviation.

2nd Stage - Cluster of eleven solid propellant motors, fitted into spin tub mounted on first stage.

2rd Stage - Cluster of three solid rockets.

4th Stage - Single solid rocket. (Three upper stages originally developed by JPL for Jupiter C (Composite Reentry Test Vehicle) Built by Cooper Development Corp., Monrovia, Calif.)

Shroud - Over upper stages and payload.

Guidance - Stabilized platform in booster is "space-fixed" on target. Deviations from attitude sensed by sensors and altered by swivelling the rocket nozzle. Built by Ford Instrument Co.

Height of rocket - About 76 feet.

Weight - 60 tons at liftoff.

Speed (at burnout of first stage) - 11,000 miles per hour.

Total flight time (Liftoff to orbit) - About eight minutes.

Inclination - 50 degrees to the equator.

Apogee - About 1,600 miles.

Perigee - About 240 miles.

Period - About 116 minutes.

Flight procedure - First stage burns out in about three minutes. At burnout rocket is tilted into trajectory angle. Booster separates from instrument compartment in a few seconds by explosive bolts. Retrograde rockets slow first stage. Upper stages coast before shroud is ejected by explosive bolts and shunted aside by a kick rocket. Second stage ignites after five minutes. Third and fourth stages are fired in quick succession. Two minutes after fourth stage boosts payload velocity to desired level, the burned-out motor case is separated and the loop antenna is extended.

Chron.

NEWS RELEASE

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1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: Immediately
May 18, 1961

RELEASE NO. 61-105

SATELLITE CONTRACTOR CHOSEN FOR PROJECT RELAY

The National Aeronautics and Space Administration announced today that Radio Corporation of America has been selected for contract negotiations to construct the Relay experimental communication satellite to test the feasibility of transoceanic telephone, telegraph, and television communications using an active repeater satellite.

The Goddard Space Flight Center, NASA's installation having responsibility for communication satellite programs, will negotiate and manage the contract, which will amount to approximately $3,250,000.

The RCA proposal was selected from seven proposals submitted to the Goddard Center.

Relay is the first active satellite in NASA's research and development program to explore the technology of global communication satellite systems. It differs from Project Echo and follow-on developments in the passive satellite field in that the spacecraft will contain electronic equipment to receive and retransmit radio signals between the United States and overseas points.

Under agreements approved by the respective countries, communications organizations in other countries will participate with NASA in the Relay experiments. To date, as previously announced, the British General Post Office and the French Center for Telecommunications Studies have agreed to provide ground stations in Europe for transmission of multi-channel telephone, telegraph, and television signals in connection with Project Relay.

The Relay satellite will weigh about one hundred pounds, and will be placed in an orbit extending outward to about 3000 miles. A Delta launch vehicle will be used.

The spacecraft will contain instruments to detect radiation damage and other environmental effects on critical components as well as the communications equipment. It will be launched from Cape Canaveral.

Ch. Echo

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FOR RELEASE: IMMEDIATE
May 19, 1961

RELEASE NO. 61-106

INFLATION TESTS OF 135-FOOT RIGIDIZED SPHERE

First inflation tests of a 135-foot rigidized inflatable balloon satellite were carried out successfully on May 18 at Weeksville, North Carolina, by the NASA Langley Research Center and the G. T. Schjeldahl Company, Northfield, Minnesota, which fabricated the huge balloon under contract to NASA.

The tests were conducted in the same dirigible hanger used to test the 100-foot Echo I sphere some months before it was launched into orbit on August 12, 1960. Purpose of the tests was to verify the structural strength of the newly designed sphere. The processes involved an inflation to 4,000 pounds per square inch tensile stress of the skin for four hours, followed by an inflation to destruction at a tensile stress of 18,000 pounds per square inch. The balloon is not expected to attain more than 4,000 pounds per square inch tensile stress when in orbit, proving the design has a safety factor of $4\frac{1}{2}$. The balloon was equipped with strain gauges and thermometers in the trials which took eight hours to complete.

Made of a three-ply laminate, the balloon skin consists of two layers of .20 mil aluminum foil cemented to .35 mil thick mylar plastic. When folded and packed, the 500-pound balloon fits into a 40-inch spherical metal container.

The satellite is expected to be placed into orbit as a passive communications experiment sometime next year under management supervision of the NASA Goddard Space Flight Center.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

NASA RELEASE NO. 61-107

HOLD FOR RELEASE UNTIL PRESENTED
(Expected time: 10:00 a.m., 5/23/61)

STATEMENT TO THE COMMITTEE ON SCIENCE AND ASTRONAUTICS, U. S. HOUSE OF REPRESENTATIVES, 23 May 1961, BY MR. MILTON W. ROSEN, DEPUTY DIRECTOR OF LAUNCH VEHICLE PROGRAMS

I welcome the opportunity to appear before this Committee to discuss the significance of orbital operations to the national space program.

The long range importance of orbital operations was recognized by NASA when studies of ballistic missile interception were followed by studies of satellite interception and space vehicle rendezvous. These studies were initiated within the NASA Research Centers. Orbital operations begin when we try to maneuver a space vehicle toward a second orbiting space vehicle for one or more purposes. We may want to inspect other satellites, maintain and assemble either manned and unmanned vehicles in orbit, dock and refuel space vehicles, rescue astronauts in difficulty, capture a space vehicle and return it to earth for inspection, and also launch a space vehicle from orbit.

Although orbital operations will require extensive development to achieve operational capability, two reasons for its importance to NASA are:

(1) By this method, the performance capability of an available launch vehicle could be extended, as a temporary measure, until a direct flight vehicle can be developed, and

(2) Only by this technique can the NASA objective of a "permanent" or long term, manned earth satellite be accomplished.

The long term earth satellites will require docking, refueling, assembly, maintenance, repair, and cargo and personnel transfer.

Orbital Rendezvous is the name applied to the process of sighting, maneuvering toward and docking at an earth orbiting "target" vehicle by a second space vehicle called the "seeker." The rendezvous operation consists of (1) the launching of the seeker vehicle after the target vehicle is in orbit (2) the mid-course phase during which the seeker is placed into an orbit close to that of the target vehicle (3) a terminal guidance and control phase during which the two vehicles are brought into close proximity with the same velocity and attitude and (4) a docking phase when actual coupling maneuvers begin and the two vehicles are locked together.

For many space programs, payload weight is considerably greater than the capabilities of current boosters. As a temporary measure, while developing larger or more advanced booster systems, assembly of components in an earth orbit and launching an assembled and/or refueled vehicle from orbit could make possible larger payload missions.

The complexity of orbital operations and the many areas of research and development to achieve practical and reliable rendezvous, docking and orbital launch techniques have been examined by in-house and contracted studies. The difficulty of accomplishing an orbital rendezvous may be considered by comparing it with the job of an anti-satellite missile. Such a missile must coincide with its target in time and space. A rendezvous vehicle must coincide with its target in time, space velocity and direction to accomplish its objective. These additional requirements add greatly to the task of achieving successful orbital rendezvous. In the next chart the current contracted studies are listed, together with the firms making the investigations.

The Flight Performance Manual contractor will organize all the engineering information needed in studying how to get from the launch site to an orbiting vehicle. The result will be an engineering manual for use by space vehicle designers and mission analysts.

The purpose of Orbital Launch Operations studies is to obtain engineering standards and cost estimates for orbital launch operations. The study will consider the assembly of the vehicle in space, assembly and operation of the launch facility, operation of all equipment necessary for launching, refueling, communications, tracking, cargo and personnel transfer.

The Orbit Launched Vehicles studies will develop designs of orbit launched vehicles with propulsion systems that should be available in the period of 1965 - 1970.

The Orbital Docking Demonstration study leads most directly to a program of experiments in space. It is a design study for joining the payloads of two test vehicles in orbit, in a manner that they become a single operating unit. The purpose of this study is to define a method of demonstrating orbital rendezvous, docking and refueling.

The work statement for the Orbital Operation Based on Saturn System Capabilities study is now in preparation.

The Analytical Study of a Satellite Rendezvous will estimate the possible position and velocity errors to be considered for orbital transfer maneuvers.

The objective of the Orbital Transfer and Guidance Studies is to develop guidance theory for various tasks of space flight.

One example of the possibilities of orbital operations techniques as applied to the manned lunar landing objective is illustrated in the next chart. An important aspect to the manned lunar mission is that of "man rating" which requires a launch vehicle sufficiently tested to assure reasonable reliability. The improved Saturn with "man rated" performance is not large enough to accomplish the lunar mission by a direct flight. The Nova vehicle, capable of direct flight, will require considerable testing to achieve a "man rated" status. However, the Nova booster could be launched early in the program as an unmanned carrier. One of the many possibilities which develops from these considerations is the use of orbital operations to achieve a relatively safe manned lunar flight without the risk of flying a man on an experimental Nova vehicle. As a temporary measure, until the Nova vehicle can be thoroughly "man rated," orbital rendezvous may be employed. A possible solution is to place an early non "man rated" Nova vehicle in a parking orbit. If the Nova lower stages are successful, the upper stages become the "target" vehicle in an orbital operation. The manned capsule is now launched by the "man rated" Saturn and rendezvous with the Nova upper stages is accomplished. The manned capsule and upper stages of Nova are locked together and a launch from orbit will carry the man to the moon with sufficient payload to accomplish a soft landing and return to earth. The experimental Nova, in this case, places the "truck" in orbit and the man rated Saturn carries the manned "cab" into space, where the two are combined and launched to the moon from the earth orbit.

Another illustration of the use of orbital operations to accomplish manned lunar landing, makes use of launch vehicles smaller than Nova. In this case a series of approximately six Saturns are launched to carry and transfer fuel and finally a manned capsule to an orbiting Saturn upper stage. The space refueled stage, with the manned capsule attached, is then launched from orbit to the moon. Sufficient fuel is carried to permit a soft landing on the moon and return to earth. By this method a smaller and less expensive vehicle than the Nova is employed, but the mission requires many of the smaller vehicles and the successful development of the orbital operations is involved. The operational complexity of this approach raises many questions regarding its reliability and the time to achieve it.

The Apollo manned flight program anticipates flight training in orbit. In the event an orbiting capsule is disabled and is incapable of making a safe descent, it would be desirable to launch a rescue vehicle to save the crew. The rescue vehicle would rendezvous and attach a powered capsule to the disabled vehicle, then return the crew safely to earth.

Consideration of the Manned Permanent Space Laboratory illustrates other examples of orbital operations which should be developed. It is possible that the size of the space laboratory will require that it be assembled in space. This would be accomplished by launching components into orbit and docking and coupling them to the units already assembled. After the structure is assembled, crews will be carried by seeker vehicles similar to the ones which carried the structural units; rendezvous and docking will be accomplished and the men transferred to the space laboratory. Periodic relief of the crew by new teams will be accomplished by similar maneuvers. Similarly, maintenance equipment and supplies will be periodically delivered to the laboratory.

In summary, orbital operation techniques are essential for permanent manned space laboratories and for extensive manned space operations. Further, by means of these techniques, as a temporary measure until larger boosters are developed for direct flight, an order of magnitude increase in the mission capabilities of existing launch vehicles can be realized.

- END -

NASA RELEASE NO. 61-107

NEWS RELEASE

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FOR RELEASE: Upon delivery JUN 2 1961

RELEASE NO. 61-108

Statement Of
Mr. James E. Webb, Administrator
National Aeronautics and Space Administration
Before the
Committee on Aeronautical and Space Sciences
United States Senate

Mr. Chairman and Members of the Committee:

You will recall that on May 16 I discussed with the Committee the provisions of S.1857, a bill to amend the National Aeronautics and Space Act of 1958 in several respects. In particular, the Committee focused its attention on the proposed grant of statutory authority contained in the bill to permit NASA to indemnify its research and development contractors against unusually hazardous risks. In the course of the hearing, members of the Committee suggested certain amendments to the bill that appeared desirable, and at the conclusion of the hearing NASA was asked to re-examine section 1(e) of S.1857 in order to reflect the suggestions of some of the Committee members.

We have done this, and I am here today at your request to present the revisions which I feel substantially improve the proposed legislation.

In order to highlight the revisions proposed, we have submitted to the Committee a draft that reflects the additions to and deletions from section 1(e) of S.1857. Deletions are indicated by brackets; additions by underlining.

The first revision consists of adding words to subsection (a) of the proposed indemnification legislation to make it clear that not all contracts for research and development, but only those that involve risks of an unusually hazardous nature, are intended to be covered. Although we had interpreted subsection (a) of S.1857 to be limited to such contracts, and the military departments have so interpreted and administered the provisions of 10 U.S.C. 2354, containing language identical to subsection (a), the addition of this new language would resolve any remaining doubts.

The second change is found in subsection (a)(1), where you will see that the words "liability" and "to" have been added. This revision was prompted by the fear expressed by several members of the Committee on May 16 that this grant of legislative authority might create rights and liabilities that would not otherwise exist but for the enactment of the proposed section 308 into law. As we explained in our testimony, this is not NASA's intention or desire. Moreover, the military departments do not so interpret the provisions of 10 U.S.C. 2354, where the word "claims" appears in subsection (a)(1). Nevertheless, deletion of the words "claims by" and substitution of "liability to" would appear to make our intention clearer and to constitute an improvement of the bill's language. In addition, we propose adding a new subsection (h) which would specifically limit the effect of the proposed section to providing indemnification to contractors rather than creating any new rights in third persons.

The third revision would further amend subsection (a)(1) to make it clear that, to the extent that liability to employees of contractors arises out of state or Federal workmen's compensation acts, the remedy provided in such statutes would be exclusive. Such liability would, therefore, be excluded from any indemnification coverage authorized under subsection (a)(1).

The fourth revision, which would modify subsection (b)(2), would limit the right of participation of the United States in the defense of suits or claims against contractors to those suits or claims for which indemnification is provided. This would be consistent with existing practice in the case of suits and claims arising under Government contracts.

The fifth revision arises out of comments made by Senator Bridges on May 16 and endorsed by other members of the Committee. This matter relates to the procedures for making payments for claims of contractors arising out of incidents that fall within the indemnification coverage of NASA contracts. We propose the deletion of subsection (d) in its entirety and the substitution of a new subsection, as set forth in our draft. You will observe that this change would permit payment to be made from funds obligated for the performance of the contract concerned or from funds available for research and development, and not otherwise obligated, where the total amount of claims arising out of a single incident does not exceed $100,000. However, in such cases, a full and complete report concerning the amount of claims and the basis for payment would be required to be made to this Committee and to its counterpart in the House of Representatives. The details of this procedure are spelled out in subsection (d)(2). With respect to claims totaling more than $100,000, subsection (d)(1) would require a specific appropriation by the Congress before payments could be made.

In this connection, the Committee will recall that during the hearing on May 16 Senator Smith asked if NASA would be agreeable to having the Attorney General review its findings on claims in excess of a certain amount, and I replied in the affirmative. It seems to us that the procedure spelled out in the revised subsection (d) would take care of this point, since it enables the Senate and House Committees to refer any proposed payment to the Department of Justice for review before disbursement is actually made by NASA. It would seem unnecessary to write into the bill a provision requiring NASA to refer proposed payments to the Department of Justice for review before reporting them to the Committees. However, if the Committee feels otherwise, we would recommend that referral to the Department of Justice by NASA be limited to the class of payments described in subsection (d)(1), which would require a specific appropriation by the Congress before payment could be made.

Subsection (e) is an entirely new provision patterned generally after section 170b. of the Atomic Energy Act (42 U.S.C. 2210(b)). It would require contractors of NASA to acquire financial protection from private sources of such types and in such amounts as NASA would require. The amount of financial protection would be the maximum amount of insurance available from private sources, except that NASA could establish a lesser amount taking into consideration the cost and terms of private insurance. In adding this subsection to the bill, it would be made clear that NASA has no intention of acting as an insurer where commercial insurance is reasonably available. We hope that this new subsection provides a satisfactory answer to the very pertinent questions which Senator Anderson, in particular, asked about this aspect of the bill.

The next change proposed arises out of the suggestion of several members of the Committee that the total liability authorized to be assumed by the Government should be limited. Subsection (f) would accomplish this result. It is patterned after section 170d. of the Atomic Energy

Act (42 U.S.C. 2210(d)) and establishes a maximum liability of $500,000,000, the same figure as appears in the Atomic Energy Act. The effect of subsection (f) is not only to limit the potential liability of the Government in connection with any single incident but also to limit the liability to third parties of indemnified contractors and subcontractors.

Subsection (g) of our draft would require NASA to use the facilities and services of private insurance organizations to the maximum extent practicable in administering the provisions of this section. This provision is identical to its counterpart in the Atomic Energy Act.

Finally, we would propose adding a definition of "contractor" to make clear that indemnification coverage may be extended to subcontractors on the same basis and to the same extent that it is available to prime contractors. At the present time, the Department of the Air Force interprets and administers the provisions of 10 U.S.C. 2354 so as to embrace subcontractors. It is important to clarify this matter beyond doubt in connection with NASA's revised proposal, because subsection (f), which serves to limit the liability of "contractors," must be made to apply clearly to subcontractors as well if this provision is to have the effect intended.

I have completed, Mr. Chairman, my explanation of the changes we would propose be made in section 1(e) of S.1857 relating to the subject of indemnification.

At the close of the hearing on May 16, the Chairman requested information regarding the comparative experience of NASA and the military departments in placing contracts for work that involves risks of an unusually hazardous nature. While a useful comparison is difficult to make, the available information has been transmitted to the Chairman for inclusion in the record.

61-107

Statement Of
John A. Johnson, General Counsel
National Aeronautics and Space Administration
Before The
Subcommittee on Patents and Scientific Inventions
House Committee on Science and Astronautics
May 26, 1961

Mr. Chairman and Members of the Subcommittee:

We welcome this opportunity to present to the Subcommittee a summary of the patent policies which the National Aeronautics and Space Administration has adopted with reference to contractors' inventions under section 305 of the National Aeronautics and Space Act of 1958.

The Act provides that whenever the Administrator of NASA determines that an invention made in the peformance of work under a NASA contract was made under the conditions specified in subsection 305(a), such invention shall be "the exclusive property of the United States, and if such invention is patentable a patent therefor shall be issued to the United States upon application made by the Administrator, unless the Administrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of subsection (f) of this section." Subsection (f) provides that the Administrator, under such regulations as he shall prescribe,"may waive all or any part of the rights of the United States under this section with respect to any invention or class of inventions made or which may be made by any person or class of persons in the performance of any work required by any contract of the Administration if the Administrator determines that the interests of the United States will be served thereby." Subsection (f) goes on to provide that any such waiver "may be made upon such terms and under such conditions as the Administrator shall determine to be required for the protection of the interests of the United States." It specifically requires, however, that each such waiver "shall be subject to the reservation by the Administrator of an irrevocable, nonexclusive, nontransferable royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States."

Before describing the policies which NASA has adopted for the administration of these provisions of section 305, some preliminary observations are in order, since public comment on this section of the Act frequently gives the impression that a contract with NASA necessarily entails the loss of patent rights which the contractor would otherwise be entitled to retain. Section 305 definitely does not provide that all inventions made in the course of performing contracts with NASA shall become the property of the Government. Nor does it provide that any particular class of inventions made under NASA contracts shall become the property of the Government. Finally, it does not provide that every invention made under the conditions enumerated under subsection 305(a) of the Act shall necessarily become the property of the Government. In all cases, even if the facts relating to the invention and the contract under which it was made are such as to enable NASA to acquire exclusive property rights to it on behalf of the United States, the Administrator may waive "all or any part" of those rights if he determines "that the interests of the United States will be served thereby."

To state it somewhat differently, a NASA contractor may retain property rights to inventions for any of the following reasons:

a. The invention, although utilized in the performance of a contract with NASA, was made independently of any such contract.

b. The invention, although made under a NASA contract, was not made under any of the conditions specified under subsection 305(a) so as to warrant a positive determination pursuant to that subsection.

c. The Administrator, in the exercise of his discretionary powers, waives the rights of the United States to the invention.

On the other hand, while recognizing the opportunities for NASA contractors to retain private rights to inventions, there is no doubt that the Congress intended the provisions of section 305 to result in some measure of acquisition by the United States of property rights to inventions made in the performance of NASA contracts. If this were not so, it would have been simpler to omit this section from the Act entirely, thus leaving NASA in the same legal posture as the Department of Defense so far as contractors' inventions are concerned.

The detailed statutory provisions concerning this subject in section 305 are consistent only with a Congressional intent that NASA not follow the patent policies of the Department of Defense but that it discriminate carefully, in the light of "the interests of the United States," between those inventions which should become the property of the Government and those which should remain in private ownership.

In the debate which has been going on for many years between the proponents of the Government's taking title to contractors' inventions and those who favor acquiring only a royalty-free license for Government use, there appears to have been rather general agreement that the Government's patent policies should, in the words of the Constitution, "promote the progress of science and useful arts" by stimulating inventive activity and encouraging the earliest and widest use of inventions for the benefit of the public. One of the fundamental purposes of the patent system is not served unless an invention is given practical application so that the public derives some tangible benefit from it.

It is frequently necessary that a single firm or person either own an invention or have the exclusive license under it in order to be willing to risk the capital required for its speedy development. The monopoly which the patent system provides is intended to make such risk-taking more attractive than would otherwise be the case.

The taking by the Government of title to inventions made in the course of Government-sponsored research and development work may deprive the public of this very real economic benefit from the patent system. The commercial development of certain inventions undoubtedly is retarded by the loss of patent protection through the Government's acquisition of title.

On the other hand, there is a definite public interest in being sure that the retention in private hands of patent rights to inventions resulting from Government-sponsored research and development actually operates in the beneficial way which is claimed for the patent system. The possibility that the patent may be used to suppress, rather than advance, a new line of technological development is certainly a legitimate object for concern, even though the instances of such misuse may be few and far between. As the result of the expenditure of public funds, the Government has a substantial interest in precluding suppression of such inventions and in deriving practical benefits from them for the public at an early date.

NASA's policies concerning retention or waiver of the Government's rights to contractors' inventions have been developed with these considerations in mind. As basic policy, NASA has announced that waiver would be in the interests of the United States "where (a) the stimulus of private ownership of patent rights will encourage the development of the invention to the point of practical application earlier than would otherwise be the case, or (b) there are substantial equities justifying the retention of private rights in the invention."

In carrying out this basic policy, NASA has established criteria by which inventions are grouped into two general classes - first, those inventions not generally eligible for waiver; and second, those inventions with respect to which a prima facie case for waiver may be established. Concerning the first class, it is NASA's policy that the interests of the

United States would not generally be served by waiver of its rights with respect to any invention which is "primarily adapted for and especially useful in the development and operation of vehicles, manned or unmanned, capable of sustained flight without support from or dependence upon the atmosphere," or is "of basic importance in continued research toward the solution of problems of sustained flight without support from or dependence upon the atmosphere." Even with respect to such inventions, however, the Administrator is not precluded from granting a waiver whenever it appears to his satisfaction that waiver would be in the interests of the United States in accordance with the basic policy stated above.

With respect to the second class, NASA considers that the following circumstances establish a prima facie case for waiver of title:

First, where the invention was conceived prior to and independently of, but was first actually reduced to practice in, the performance of work under a NASA contract, and the invention is covered by a United States patent issued or application filed prior to the award of the contract; or

Second, where the invention was conceived or first actually reduced to practice in the performance of a NASA contract for research work with a nonprofit organization whose primary purpose is the conduct of scientific research, and the contract does not call for the delivery of models of equipment or the development of practical processes; or

Third, where it appears that the invention has only incidental utility in the conduct of activities with which NASA is particularly concerned and has substantial promise of commercial utility; or

Fourth, where the invention is directed specifically to a line of business of the contractor with respect to which the contractor's previous expenditure of funds in the field of technology to which the invention pertains has been large in comparison to the amount of funds for research or development work in the same field of technology expended under the NASA contract in which the invention was conceived or first actually reduced to practice.

If an invention does not fall within any of the foregoing categories, waiver may nevertheless be granted whenever it appears to the satisfaction of the Administrator that such action would serve to carry out NASA's basic waiver policy.

As mentioned above, NASA has the statutory responsibility for protecting the "public interest" in exercising its waiver authority. It has sought to do this by providing that all waivers, except those granted on inventions developed to the point of practical application prior to the request for waiver, and waivers granted on inventions conceived prior to and independently of, but first actually reduced to practice in, the performance of work under a contract of the Administration, will be voidable at the option of the Administrator unless the recipient of the waiver shall, on or before the end of the fifth year from the grant of a United States patent on such invention or the end of the eighth year from the date of acceptance of the waiver, whichever is sooner, demonstrate to the Administrator (1) that the invention has been developed to the point of practical application, or (2) that the invention has been made available for licensing either royalty-free or at a reasonable royalty rate, or (3) that there are circumstances justifying failure to comply with either of the foregoing and concurrently justifying continuance of the waiver.

Subsection 305(g) gives NASA the authority to grant licenses "for the practice by any person (other than an agency of the United States) of any invention for which the Administrator holds a patent on behalf of the United States."

It is NASA policy to grant a nonexclusive, royalty-free license to the NASA contractor responsible for the making of an invention which becomes the property of the United States pursuant to section 305 of the Act. This license will be revocable at the option of the Administrator if the recipient fails, before the end of the fifth year from the date of the issuance to the Administrator of a United States patent on the licensed invention, to demonstrate that the invention has been developed to the point of practical application. NASA will propose, during this period of time, which should be adequate in most instances for new product development, to grant other non-exclusive licenses, revocable on the same conditions, to qualified applicants. If the invention has not been developed by the end of this period, it would be reasonable to conclude that a factor precluding development was the lack of exclusive rights, typically available under the patent system, which would justify the risks of development. NASA would then be in a position to rectify this situation by revoking all nonexclusive licenses and granting an exclusive license under the condition that the invention would be developed within a specified period of years. There would be reserved from the exclusive license a nontransferable, royalty-free right for the practice of the invention by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States. Failure to comply with the condition would result in revocation of the exclusive license.

In conclusion, I think it may be fairly stated that NASA's policies and procedures have been developed with three principles in mind: first, that the burden of administration, both upon NASA and its contractors, should be lightened as much as possible within the framework of the present statutory provisions; second, that economic progress, the strengthening of small business, and the long recognized benefits of the patent system are frequently served best by the retention of rights to inventions in the hands of private parties who are motivated to exploit them for commercial purposes; and third, that the Government has a continuing interest in making sure that inventions produced in the course of research and development work financed with public funds are actually put to practical use.

We believe that industry generally feels that NASA's administration of section 305 has been fair and reasonable. As industry has gained experience with NASA's patent policies and procedures, most of the early resistance to doing business with NASA has disappeared; and during the past year, we have encountered very little unwillingness on the part of contractors to do work for NASA because of fear of the consequences of section 305. We have had very few complaints from contractors concerning their actual experience under the patent provisions of our contracts.

As the Committee knows, the whole matter of government patent policy has been undergoing intensive review by the Congress during the past year. Several bills have been introduced which would establish a uniform patent policy for all government agencies financing research and development by means of contracts and grants; and extensive hearings have recently been held on these bills. Since the subject reaches far beyond NASA's own area of activity, and since we are not currently experiencing any major difficulties in contracting with industry because of the patent provisions of the Space Act, we have thought it best at this time not to make any request for revision of section 305.

61-109

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE ACTIVITIES SUMMARY RELEASE NO. 61-110 EXPLORER

Project: Explorer

Project Direction: NASA

Launched: May 24, 1961
3:48 EDT
From: Atlantic Missile Range

Lifetime: Not Applicable

Major Objectives Determine ionospheric electron content under quiet & disturbed conditions, study daily & seasonal variations; investigate ionospheric radio wave propagation.

Major Results: Orbit not achieved. Second stage failed to ignite.

S-61-12

Flight Program

Launch Vehicle: Juno II. Stages: (1) Modified Army Jupiter IRBM; (2) 11 solid propellant motors; (3) Three solid rockets; (4) Single solid rocket.

Lift-Off Weight: 121,000 lbs.(Approx.)

Dimensions: 76 ft. high; 8-3/4 ft. base diameter.

Program: Place satellite in highly elliptical earth orbit.

Program Results: Orbit not achieved.

Perigee (Miles): Not applicable
Apogee (Miles): Not applicable

Inclination: Not applicable
Period: Not applicable

Velocity: Not applicable

Payload And Instrumentation

Dimensions: 30 in. diameter; 24 in.high Extends to 6-ft. diam. when loop antenna unfolds in orbit.

Payload Weights: 75 lbs.

Payload Configuration: Two aluminum truncated cones joined at bases.

Instrumentation: Transmitter; aspect sensor; 7 temperature sensors; two antennas.

Transmitters: Single transmitter broadcasting on six frequencies at varying levels of power: 20.005; 40.010; 108.02; 360.09; 960.24; 41.010 mc.

Power Supply: Solar cells and nickel cadmium batteries.

EXPLORER

Additional Data: Program participants included the Seagrove Radio Research Station, of New Zealand, the U.S. National Bureau of Standards, as well as the Pennsylvania State, Illinois and Stanford Universities.

Sources: NASA

Date: May 25, 1961

Prepared by Office of Public Information, U.S. National Aeronautics and Space Administration, Washington 25, D.C.

Chron.

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: IMMEDIATE
May 25, 1961

RELEASE NO. 61-111

TIROS II EXCEEDS ESTIMATED OPERATIONAL LIFETIME

TIROS II completed six months in orbit on May 23, 1961, and is continuing to transmit useful data, the National Aeronautics and Space Administration announced today.

The meteorological satellite was launched November 23, 1960, and at that time had an estimated lifetime of about three months during which it was to provide global weather observations via two television cameras and two experimental infrared sensing systems.

As of May 22, 1961, a total of 31,485 photographs had been transmitted by the two television camera systems. Of these, 78 per cent of the 9,488 narrow-angle photographs and 76 per cent of the 21,997 wide-angle photographs have been classified as fair to good for meteorological analysis.

While both camera systems continue to operate and to perform at least as well as immediately after launch, one infrared system containing 5 sensors failed on April 23, 1961, after five months of successful operation; the other system has one of its sensors still operating and its other sensor failed only within the last two months. The one remaining sensor that is still operating has only limited use.

During their four to five-month period of useful operation, the IR experiments provided a great mass of unique and useful data which are being reduced, processed and studied. Moreover, all the associated electronics, including the tape recorders, continue to operate. The infrared experiments had no photographic capability.

NASA expects to launch a third TIROS some time this summer. It hopes that the satellite will be operating during the season when hurricanes are most likely to occur and circumstances will be such that TV pictures as well as IR data on at least one of these destructive storms can be obtained. The meteorological data will be furnished to the U.S. Weather Bureau and military services for their use in weather forecasting as well as for research purposes.

- END -

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

RELEASE NO. 61-113

FOR RELEASE: IMMEDIATE
May 29, 1961

JANUARY, FEBRUARY, MARCH CONTRACT AWARDS

The National Aeronautics and Space Administration awarded the following new contracts and research grants during the first quarter of 1961. The figures shown represent the total estimated cost of contracts of $50,000 or more let during the period.

HEADQUARTERS
Washington, D. C.

Cornell University (Ithaca, N. Y.) -- $117,170 -- Experimental laboratory research on destruction of lunar materials by bombardment by energetic protons and soft x-rays, their migration and physical and chemical properties.

Rensselaer Polytechnic Institute (Troy, N. Y.) -- $66,900 -- Theoretical research on interstellar dust and its interaction with ultraviolet radiation.

Case Institute of Technology (Cleveland, Ohio) -- $74,826 -- Research on a method of systematic structural synthesis suitable for use with digital computing equipment.

University of Michigan (Ann Arbor, Mich.) -- $50,000 -- Study of the interactions of optical, microwave and radio frequency radiations in potential maser materials, including electronically new materials prepared by high energy radiation.

U. S. Department of Commerce, National Bureau of Standards (Boulder, Colo.) -- $235,000 -- Conduct research on the physical properties of hydrogen, techniques for determining engineering data on cryogenic systems, and compilation of low temperature data.

Resources Research, Inc. (Washington, D. C.) -- $141,173 -- Research on radioisotopic method for detecting the presence and monitoring the metabolic activity of micro-organisms on an extraterrestrial body. Study will include design and construction of a prototype of the detecting and monitoring apparatus.

Department of the Navy (Washington, D. C.) -- $107,300 -- Investigate the mechanisms of injuries produced by vibration; evaluate vibration as a physiological stress, and establish safety and tolerance limits for the exposure of personnel to mechanical vibration.

University of California (Berkeley, Calif.) -- $198,000 -- Conduct experimental and theoretical studies of the growth and biochemical activities of terrestrial microorganisms in simulated planetary environments.

Georgia Institute of Technology (Atlanta, Ga.) -- $71,244 -- Perform a study of chemical synthesis requiring cryogenic temperatures as preparative techniques for highly endothermic chemical species.

AMES RESEARCH CENTER
Mountain View, California

Eastman Kodak Co. (Rochester, N. Y.) -- $50,000 -- Furnish photographic film processor for use at Ames.

Carl N. Swenson Co. Inc., (San Jose, Calif.) -- $566,370 -- Construction of office and test chamber building for the Mass Transfer Cooling and Aerodynamics Facility.

LEWIS RESEARCH CENTER
Cleveland, Ohio

William Passalacqua Builders, Inc. (Cleveland, Ohio) -- $76,400 -- Alterations and additions to the Electrical Propulsion Research building at Lewis.

Electronic & Missile Facilities, Inc. (New York, N. Y.) -- $1,069,795 -- Construction of Basic Materials Laboratory at Lewis Research Center.

Jess Howard Electric Co. (Columbus, Ohio) -- $51,297 -- construction of Electrical Power Service and install electrical equipment at the Altitude Rocket Test Facility at Plumbrook.

Canal Industrial Corp. (Bethesda, Md.) -- $62,181 -- Furnish micro-probe and accessories for determing distribution of metals in an alloy, segregation conditions, etc.

The Feldman Brothers Co. (Cleveland, Ohio) -- $58,600 -- Fabrication and installation of an "off-gas" storage and clean up system for the Reactor facility at Plumbrook.

George A. Rutherford, Inc. (Cleveland, Ohio) -- $1,005,000 -- Construction of Energy Conversion Laboratory at Lewis Research Center.

LANGLEY RESEARCH CENTER
Hampton, Va.

General Motors Corporation (Cleveland, Ohio) -- $64,736 -- Furnish services and material for 2000 KW Jet structure

Speidel Corp. (Providence, R. I.) -- $51,243 -- Tape recorders.

Miller Electric Co. Inc. (Salisbury, Md.) -- $262,286 -- Services and material necessary for alterations to Building F-10 located at Wallops Island.

Modern Machine & Tool Company (Newport News, Va.) -- $80,000 -- Calibration services to government owned balances.

Compudyne Corp. (Hatboro, Pa.) -- $713,286 -- Services and material for model control systems for 8-ft. High Temperature Structure Tunnel.

MB Electronics, Division of Textron Electronics, Inc. (New Haven, Conn.) -- $56,980 -- Power Emplifier for driving vibration exciter to rated force of 10,000 lbs.

Empire Gas Engineering Co. (Atlanta, Ga.) -- $444,300 -- Tunnel erection and general construction of 8-ft. High Temperature Structures Tunnel.

WESTERN OPERATIONS OFFICE
Santa Monica, Calif.

North America Aviation, Inc. -- $55,330 -- Mercury-Redstone support parts.

SPACE TASK GROUP
Hampton, Va.

Collins Radio Co. (Cedar Rapids, Iowa) -- $140,471 -- Furnish amateur type single-sideband radio equipment for use in aircraft on Project Mercury recovery operations.

Massachusetts Institute of Technology (Cambridge, Mass.) -- $100,000 -- Conduct a program of research, development and laboratory study of a guidance and navigation system for Project Apollo.

General Electric Co. (Philadelphia, Pa.) -- $90,000 -- Furnish digital computer programming services in connection with Project Mercury.

GODDARD SPACE FLIGHT CENTER
Greenbelt, Md.

United Aircraft Corp. (East Hartford, Conn.) -- $96,500 -- Perform study of the applicability of ion propulsion engines for space missions.

Washington Technological Associates, Inc. (Rockville, Md.) -- $84,450 -- Development and fabrication of payload for international ionosphere satellite S-51 to be launched by a Scout vehicle in 1962 from Wallops Station, Va.

Solid State Radiations, Inc. (Culver City, Calif.) -- $50,198 -- Conduct basic research study of the Avalanche Progress on semi-conductors for application to solid state detectors.

Ampex Data Products Co., Ampex Corporation (Washington, D.C.) -- $99,850 -- Magnetic tape recorder.

Santa Barbara Research Center (Goleta, Calif.) -- $343,426 -- Furnish medium resolution scanning radiometer for Nimbus meteorological satellite.

General Electric Co. (Philadelphia, Pa.) -- $1,515,710 -- Design and develop a stabilization and control subsystem for the Nimbus meteorological satellite and furnish a pre-prototype and a prototype.

Hewlett-Packard Co. (Palo Alto, Calif.) -- $64,974 -- Furnish counters, printers, generators and plug-in for laboratory use.

Schonstedt Engineering Co. (Silver Spring, Md.) -- $55,398 -- Furnish flux gate magnetometers for use on sounding rockets and interplanetary and lunar exploration.

Labko Scientific, Inc. (Stillwater, Okla.) -- $89,121 -- Furnish light-weight, battery-operated vibrating reed electrometer for use on scientific satellites.

California Computer Products, Inc. (Downey, Calif.) -- $555,075 -- Furnish satellite clock subsystem for Nimbus meteorological satellite.

Barnes Engineering Co. (Stamford, Conn.) -- $92,050 -- Furnish horizon sensors for use on S-6 atmospheric structures satellite.

Sonotone Corp. (Elmsford, N. Y.) -- $98,785 -- Research and development for improving performance and reliability of sealed secondary type nickel-cadmium storage batteries for satellite and space application.

Gulton Industries, Inc. (Metuchen, N. J.) -- $127,475 -- Design, development and manufacture of storage batteries for future satellites.

Aerojet-General Corp. (Azusa, Calif.) -- $992,734 -- Furnish 33 Aerobee sounding rockets and associated components.

Arthur D. Little, Inc. (Cambridge, Mass.) -- $195,874 -- Perform study of liquid propellant losses during space flight.

Jarrell-Ash Co. (Newtonville, Mass.) -- $101,458 -- Design, develop and furnish grazing-incidence grating instrumentation for soft X-ray measurement tests.

Ralph M. Parsons Co. (Los Angeles, Calif.) -- $299,900 -- Study of requirements for a National Nuclear Rocket Development Center. Contract calls for a 4-month architectural and engineering study to be conducted with Thiokol Chemical Corp., representing TALANT as subcontractor. (See NASA Release No. 60-319).

NRC Equipment Corp. (Newton Highlands, Mass.) -- $95,230 -- Design and manufacture of cold cathode ultra-high vacuum guages for application to scientific satellites.

Consolidated Systems Corporation (Monrovia, Calif.) -- $224,728 -- Furnish Minitrack digital recording systems.

Zimney Corporation (Pasadena, Calif.) -- $159,522 -- Furnish four instrumentation packets and spare parts for Skylark rocket payloads.

Vitro Electronics, Vitro Corporation of America (Silver Spring, Md.) -- $78,200 -- Furnish 34 telemetry receivers with plug-in IF module and crystal and oven combination for tracking and data acquisition activities.

General Miss, Inc. (Minneapolis 13, Minn.) -- $160,464 -- Furnish computer equipped with photo-reader, punch, typewriter and console for tracking and data acquisition.

Atlantic Research Corp. (El Monte, Calif.) -- $62,759 -- Furnish 45 Nike-Cajun sounding rocket hardware sets.

Gulton Industries, Inc. (Metuchen, N. J.) -- $127,475 -- Design, development and manufacture of storage batteries for future satellites.

General Electric Co. (Cincinnati, Ohio) -- $287,623 -- Perform study of heat transfer coefficients of boiling and condensing sodium and potassium for application to nuclear systems.

General Electric Co. (Philadelphia, Pa.) -- $200,000 -- Investigation of thermal energy storage program. (Space power technology.)

MARSHALL SPACE FLIGHT CENTER
Huntsville, Ala.

Avco Corp. (Cincinnati, Ohio) -- $76,722 -- Master decommutator and sub-decommutator for Saturn.

Norair Division, Northrop Corp. (Hawthorne, Calif.) -- $57,380 -- Prepare flight performance manual for use of designers and mission planners in the field of orbital operators.

Wyatt C. Hendrick (Ft. Worth, Texas) -- $207,000 -- Architect/Engineer services for Central Laboratory and Office Building.

Douglas Aircraft Co., Inc. (Santa Monica, Calif.) -- $92,165 -- Conduct study of orbital launch operations from an orbiting space station and resulting space exploration potentials.

Lockheed Aircraft Corp. (Sunnyvale, Calif.) -- $100,000 -- Perform early rendezvous demonstration study involving possible methods and hardware which might be used, Consolidated Systems Corp. (Monrovia, Calif.) -- $141,290 -- Furnish high-speed digital data processing system for Saturn project.

Servomechanisms Inc. (Hawthorne, Calif.) -- $67,554 -- Provide multiplexing system for Saturn.

Space Technology Labs, Inc. (Los Angeles, Calif.) -- $92,620 -- Prepare flight performance manual for use of designers and mission planners in the field of orbital operators.

Ampex Instrumentation Products Co. (Atlanta, Ga.) -- $50,400 -- Furnish transistorized magnetic instrumentation tape recording/reproducing system for Saturn.

A. L. Mechling Barge Lines, Inc. (Joliet, Ill.) -- $176,090 -- Furnish towage services for "Palaemon" the barge which will transport Saturn launch vehicle from Huntsville to Cape Canaveral, Fla.

Grumman Aircraft Engineering Corp. (Bethpage Long Island, N. Y.) -- $50,020 -- Perform study to obtain optimum trajectory of space vehicle using low-thrust engines, with minimum expenditure of fuel and energy.

General Dynamics, Corp. (San Diego, Calif.) -- $54,015 -- Perform study of principles of meteoroid protection of launch vehicles.

International Business Machines Corp. (Rockville, Md.) -- $77,271 -- Perform automatic data processing study for application to Saturn project.

Space Technology Labs, Inc. (Canoga Park, Calif.) -- $86,500 -- Conduct investigation of ion beam diagnostics.

North American Aviation, Rocketdyne Division (Canoga Park, Calif.) -- $282,950 -- Conduct stability rating program for large liquid rocket engine systems.

Cadillac Gage Co. (Warren, Mich.) -- $129,600 -- Furnish hydraulic package assemblies and components for Saturn.

Dynametrics Corp. (Burlington, Mass.) -- $96,411 -- Provide automatic calibration system for pressure tranducers in Saturn.

The Martin Co. (Baltimore, Md.) $74,191 -- Conduct conceptual study of best possible ear[illegible]-lunar transportation system for future pro[illegible]ms.

Mechman Instrume[illegible] I[illegible] [illegible]ei ([illegible]) -- $97,631 -- Design, development a[illegible] of [illegible] [illegible]ppler cycle counter for use [illegible] van[illegible] co[illegible]ut[illegible]

General Electric Co. (Pittsfie[illegible], Mass.) -- $119,613 -- Development of a cryogenic accelero[illegible]ter for future guidance systems.

The Marqua[illegible] [illegible]lif.) -- $59,945 -- Investigation [illegible] [illegible]enomena in Arc Jet engines.

Convair As[illegible] [illegible]lif.) -- $130,017 -- Perform concept[illegible] of both liquid and solid fueled laun[illegible] [illegible]e 6 to 12 million pound thrust class.

Convair Astronautics (San Diego, Calif.) -- $115,565 -- Perform conceptual design studies of a liquid fueled launch vehicle in the 2 to 3 million pound thrust class.

Lockheed Aircraft Corp. (Marietta, Ga.) -- $335,000 -- Furnish Saturn booster pressure and functional checkout equipment.

Midwest Research Institute (Kansas City, Mo.) -- $72,732 -- Conduct research on bearings for use in high vacuum conditions.

Texas Instruments Inc. (Dallas, Texas) -- $50,557 -- Design development and fabrication of prototypes of a small, solid circuit, microelectronic Binary Flip-Flop (electronic switch).

Resdel Engineering Corp. (Pasadena, Calif.) -- $58,566 -- Design, development and fabrication of radio frequency multipliers for Saturn.

North American Aviation, Inc. (Downey, Calif.) -- $148,487 -- Perform conceptual design studies of a liquid fueled launch vehicle in the 2 to 3 million pound thrust class.

North American Aviation, Inc. (Downey, Calif.) -- $160,041 -- Perform conceptual design studies of both liquid and solid fueled launch vehicles in the 6 to 12 million pound thrust class.

Staffer Chemical Co. (New York, N. Y.) -- $66,000 -- Research and development of high temperature resistant polymeric film forming material for advanced space application.

Electro Optical Systems, Inc. (Pasadena, Calif.) -- $74,941 -- Perform ionizer development and surface physics studies.

Lift-A-Loft Co. (Muncie, Ind.) -- $74,445 -- Provide a lifter, personnel and a Vert-A-Lift with masts for Saturn.

The Martin Co. (Baltimore, Md.) -- $63,756 -- Furnish heat exchanger coil assemblies for Saturn.

Consolidated Electrodynamic Corp. (Atlanta, Ga.) -- $86,499 -- Furnish oscillograph and recording amplifier, for laboratory use.

Sverdrup & Parcel & Associates, Inc. (St. Louis, Mo.) -- $98,000 -- Architect-Engineer services for additions to Guidance and Control Laboratory.

The Martin Co. (Baltimore, Md.) -- $163,040 -- Perform conceptual design studies of a liquid fueled launch vehicle in the 2 to 3 million pound thrust class.

Chrysler Corp. (Detroit, Mich.) -- $79,220 -- Conduct investigation of corrosion and corrosion prevention in various components and materials in the Saturn vehicle.

Cook Technological Center (Morton Grove, Ill.) -- $67,216 -- Research and development to determine wind shears at high altitudes.

Packard Bell Computer Corp. (Los Angeles, Calif.) -- $66,800 -- Furnish TRICE high speed digital simulator components.

Sverdrup & Parcel & Associates, Inc. (St. Louis, Mo.) -- $200,000 -- Architect/engineer services for instrumentation and addition to Check-out Buildings, Quality Division.

Aerojet-General Corp. (Covina, Calif.) -- $246,089 -- Architect/engineer services for Saturn static test facility at Marshall.

Radio Corporation of America (Van Nuys, Calif.) -- $316,611 -- Development of a Saturn ground computer compex.

Packard Bell Electronics Corp. (Los Angeles, Calif.) -- $3,008,000 -- Automatic checkout system for S-1 Saturn vehicle.

University of Alabama (University, Ala.) -- $53,262 -- Research on the theoretical physics of ion beam propulsion.

North American Aviation, Inc (Downey, Calif.) -- $170,000 -- Perform study of paraglider recovery system for Saturn vehicle.

Ryan Aeronautical Co. (San Diego, Calif.) -- $145,828 -- Perform study of paraglider recovery system for Saturn booster.

International Business Machine Corp. (Huntsville, Ala.) -- $78,000 -- Furnish sound recording tape for laboratory use.

Lockheed Aircraft Corp. (Marietta, Ga.) -- $136,743 -- Perform conceptual design studies of both liquid and solid fueled launch vehicles in the 6 to 12 million pound thrust class.

Leland Stanford Jr. University (Stanford, Calif.) -- $50,000 -- Perform analytical and experimental evaluation of possible space-charge flow configurations suitable for use in ion guns.

Bendix Corporation (Davenport, Iowa) -- $75,000 -- Development and fabrication of liquid level sensing systems to determine actual level of cryogenic fuels.

- END -

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Remarks by

JAMES E. WEBB, ADMINISTRATOR
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FIRST NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE
TULSA, OKLAHOMA
MAY 26, 1961

Governor Edmondson, Friends:

No one could live in or be associated with Oklahoma for almost ten years, as have my wife and I and our two children, without realizing that this is a land of tremendous space and and boundless horizons; with the outlook of the pioneer; capable of projecting into the challenging New Frontier of Space the competence, the willingness to experiment, the restlessness, and the personal courage and drive of the Great Southwest. I know that through your great universities and colleges, through the efforts of your leaders in every field, and through such activities as the Frontiers of Science Foundation of Oklahoma and this First National Conference on the Peaceful Uses of Space, you are determined to build here a modern scientific innovative culture that will furnish leaders for the space age in the vigorous tradition you have always maintained. Our national space effort needs these qualities, and it needs Oklahoma and the Southwest.

Fresh from my intimate experience with the ferment of the modern Oklahoma frontier, I have had no difficulty in feeling at home on the space frontier -- or indeed in President Kennedy's "new frontier." It was only necessary to change the habit of looking forward to the habit of looking outward.

Three and a half years ago, a short time even in the history of a new state like Oklahoma, the Russians were clearly ahead of us in space. They had launched the first manmade earth satellite -- Sputnik I. Since then they have sent twelve vehicles into earth orbits, including the spaceship that carried Cosmonaut Gagarin around the globe. Although only one Soviet satellite is still in orbit, it is important to keep in mind that five of them weighed in the neighborhood of ten thousand pounds and that three of these large vehicles have been recovered from earth orbits.

In this same period, the United States has mounted a determined, major effort in the field of space exploration. We have drawn together in the National Aeronautics and Space Administration more than seven laboratories and space-flight research centers. The United States has placed in orbit 39 satellites of which 22 are still circling the world, with nine still transmitting signals and valuable scientific information about our space environment. And just two weeks ago, openly, before the eyes of the world, we conducted the first Project Mercury man-carrying suborbital flight. You all know that Alan Shepard was the Astronaut.

During the period since Sputnik I, we have evolved the technology that made this giant stride possible. We have also drawn heavily on the bank of scientific knowledge accumulated over many years by means of telescopic observation of the phenomena of the universe, filtered through the veil of the earth's atmosphere. On this scientific and technological foundation, we have developed means of designing spacecraft and of rocketing them into space packed with electronic equipment to isolate, measure, and observe specific phenomena. Data gathered by our satellites and probes have been radioed to earth. This enormous flow of information is being analyzed continuously by the most modern computer systems, and we are distributing the results to scientists in every nation. Thus we have achieved a position of open science, openly arrived at, by spreading these new examples of the puzzles and problems which every great scientific advance generates, to the largest possible number of able minds for interpretation and solution.

As an example of how this system works, on March 11, 1960, Pioneer V was launched by a Thor-Able rocket to gather scientific data from deep space and to test communications over interplanetary distances. This deep-space probe weighed 94 pounds and contained two radio transmitters and receivers. In it were instruments to measure radiation streaming from the sun, the spatial distribution of energetic particles and medium-energy electrons and protons, the number and density of meteoric dust particles striking the probe, and the strength of magnetic fields.

We were able to communicate with Pioneer V for a distance of 22 million miles and through it confirmed the existence of an electrical ring current circling the earth at an altitude of 40,000 miles, the existence of which had been speculated on by geophysicists for more than 50 years. Pioneer V also measured an intense zone of disturbed magnetic fields at distances of 40,000 to 60,000 miles from the earth, revealed that the boundary of the earth's magnetic field is twice as far from earth as had been previously supposed, and reported the first direct observation of pure cosmic rays at altitudes completely free of the earth's atmosphere. This observation was made three million miles in space.

I could list many other achievements in this three and a half year period, such as the discovery of the Great Radiation Belts, now named the Van Allen Belts for Dr. James Van Allen of the State University of Iowa, one of the eminent scientists working with the Space Administration. I could mention that our first weather satellite, Tiros I, completed more than 1,300 orbits of the earth and transmitted more than 22,000 pictures before we lost communication with it. I could go on to mention Echo I, NASA's brightly twinkling, earth-orbiting balloon which has been seen by millions and which has proved the feasibility of using satellites to reflect radio and other electronic signals. But I think I have made the point that the U.S. space effort has progressed in the three and a half years since man fired into orbit the first artificial earth satellite.

In so short a time, while carrying out much of the activity I have outlined, the work force of the National Aeronautics and Space Administration grew from 7,966 at the outset to 18,000 now. Our annual expenditure of funds rose from $145,490,000, during Fiscal Year 1959, our first year of operation, to what we estimate will be about $760,000,000 when Fiscal Year 1961 ends this June 30.

I believe it is fair to say that during this period the United States achieved first position in space, science, and technology and merited the confidence of the world scientific community. But there was one major field in which we did not make the necessary effort to achieve first position. This, unfortunately, was the area of building the large, high-thrust rocket boosters required to lift heavy payloads into space and to achieve sustained manned space flight. The U.S.S.R. did make the necessary effort and has reaped the benefit in world-wide acclaim.

So much for the past three and a half years. My own entry into this highly complex new dimension came three and a half months ago, when President Kennedy sent a message which I received while attending an Oklahoma City luncheon in honor of Senator Kerr. I can only surmise what went on in past years, but I know personally the intensity of work over the past 14 weeks.

There was the driving demand by the President and the Vice President that every facet of the requirements to recover our lost position be examined and evaluated.

There was the penetrating analysis of our past weaknesses by the Vice President, based on his experience during his two years' service as Chairman of the Senate Committee on Aeronautical and Space Sciences, with the follow-up of Senator Kerr, who succeeded him as Chairman of that committee.

There were the incisive and meaningful sessions with the Secretary of Defense and the Chairman of the Atomic Energy Commission to bring the diverse elements into harmony in the form of a national space program.

There were the long and detailed presentations to the Director of the Budget so that he might test the validity of our conclusions and assimilate the facts that would permit the President to weigh the requirements for the space program against the other urgent requirements of defense and national interest.

There was the decision of the President that the key to retrieving our position lay in determining that we could no longer proceed with the Mercury one-man spaceship as if it were to be the end of our program, but that we must -- even in a tight budget situation -- present to Congress the urgent necessity for committing ourselves to the giant boosters required to power the larger craft needed to accommodate crews of several men on long voyages of deep space, lunar, and planetary exploration.

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#Here are some of the details of the program:

Funds were increased to speed up the Saturn C-2 booster and the large single-chamber 1.5-million-pound-thrust F-1 engine which will be one of the basic building blocks for Nova, the biggest rocket we have yet programmed. That is, to say, we shall use the F-1 rocket as our basic building block unless the new decision of the President, announced yesterday -- that we will parallel development of this liquid-fuel rocket with a solid-fueled rocket -- produces a better and more powerful engine using some type of solid propellant.

Thus, the first major decision of the new Administration in the field of space was to step up the big-booster program to provide lift for larger and more advanced spacecraft.

The intensity of the effort pervading the past three and a half months did not end for me with President Kennedy's decision. At the same time that we were presenting the new program to the Senate and the House committees, the National Aeronautics and Space Council was being reorganized and the leadership of its Chairman, Vice President Johnson, was coming increasingly into play. The President asked the hard questions. The Vice President demanded the work to provide the answers. Those of us charged with getting the facts could see little difference between night and day, day in and day out, weekends and holidays.

We did manage to do the work. Based upon it, the President made his decision, and yesterday he announced major new goals for the Nation and new programs to achieve them.

The FY 1962 authorization request for the National Aeronautics and Space Administration is now increased to $1,784,300,000 or by 61 percent. The Space Agency expenditures for 1962 are now estimated at $1,380,000,000 or an increase of 43 percent.

The first augmentation of the Space Program by President Kennedy in March was primarily for the purpose of speeding up the booster and propulsion components whose development must precede an expanded program of manned and unmanned exploration of space. Further increases in this area, aggregating some $144.5 million, are included in the requests made by the President yesterday. Included is the initiation of a Nova vehicle of very large thrust, with sufficient power to land men on the moon and return them to earth. The increased request also provides an additional $130.5 million for Apollo, which will lead both to a three-manned earth orbiting laboratory and a manned lunar landing spacecraft. $66 million is requested for an accelerated effort in research and exploration of the environment around the earth, around the moon, and in the space between. Funds are provided for a study of the problems of return to earth from flights around the moon at reentry speeds up to 25,000 miles per hour which will generate extreme heat.

Thorough studies of radiation problems will be conducted including an analysis of solar activity over the past 50 years in order to predict, if possible, the periods of extreme radiation which man must avoid.

In President Kennedy's new request, there is an item of $50 million to expedite the development of solar cells, transistors, and other components and to demonstrate Trans-Atlantic television, as well as to bring into being the kind of satellite communications system needed to meet governmental as well as commercial requirements.

In the area of meteorological satellites, there is an increase of $22 million to expand the Tiros flight program, and, in addition, the President has requested $53 million for the Department of Commerce to enable the Weather Bureau to proceed without delay toward the development of a world-wide meteorological satellite system based on the Nimbus satellite now under development by NASA as a follow-on to the Tiros series.

In connection with NASA's program of speeded-up research and development of liquid propellant engines, an additional $15 million is provided to accelerate the 1.5 million pound thrust F-1 engine program, and $58 million is provided for long lead-time propulsion-development facilities such as static test stands for single and clustered engines; facilities for testing booster stages powered with clustered engines, and design of new launch facilities for the much larger flight vehicles to come in support of the manned lunar effort. The largest booster vehicle which is funded in this program is the Nova. $48.5 million is provided to start work on a liquid-fueled Nova flight vehicle.

The Department of Defense through its Minuteman and Polaris developments has great capability in the field of large solid-propellant rockets. Therefore, solid-propellant booster stages for the Nova vehicle will be developed by the Department of Defense in parallel with NASA's liquid-fueled stages. The Department of Defense budget will include $62 million to begin work in fiscal year 1962. This means that both of the liquid- and solid-propellant technologies will be driven forward at the rapid rate needed to assure the earliest availability of a Nova vehicle. As soon as the technical promise of each approach can be adequately assessed, one will be selected for final development and utilization in the manned space program.

Included in the requests is $23 million additional for the ROVER program for NASA's share in the cooperative NASA-AEC project looking toward a nuclear rocket engine. This includes $15 million for engine test facilities which should be started now in order to achieve the earliest feasible flight date.

From the above it is clear that the President's requests, taken as a whole, establish a pattern of effort that adds up to a vigorous, well-rounded national space program. There is wide participation by many departments and agencies.

This program in order to be successful, will require a sustained and highly paced national effort over a number of years. The President's action today not only steps up the program for the first year but also contemplates an increased tempo for future years.

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To provide you with perspective on the dimensions and stage ratings of the Nova vehicle that will be used to land the Apollo spacecraft on the moon and return it to earth, -- listen to these figures:

The overall height of Nova will be some 360 feet -- 60 feet taller than a football field is long.

The diameter of the first stage will be some 50 feet, and of the upper stages some 25 feet.

In one version the first stage will consist of eight clustered F-1 engines, each developing a thrust of 1.5 million pounds, using conventional rocket fuel. In cluster, the engines will produce a total thrust of about 12 million pounds.

This version also calls for second and third stages fueled with liquid hydrogen and liquid oxygen.

The Apollo spacecraft will carry its own propulsion system, retrorockets for soft lunar landing and other rockets for take-off from the surface of the moon and return to the earth. Apollo will weigh about 150,000 pounds.

Since the early days of World War II, the American people have faced many crises and have had the courage to make the hard decisions. The war effort was mounted and our arms were victorious. In the postwar world our deepest hope and desire was that the people of all lands would share basic individual fulfillment in peace, freedom, justice, and continuing progress. We were confronted, instead, with the cruel reality of a powerful despotism, bent on burying us along with the basic tenets upon which our society rests and from which it draws its strength.

We Americans are a pragmatic people and we have always adopted new measures to meet new conditions. In the post-war period major milestones were passed with the adoption of the Marshall Plan, of the North Atlantic Treaty Organization with its military assistance program, support of the United Nations' action in Korea, the landing of troops in Lebanon, the Berlin airlift, and others that you can recall.

Now we are faced with another national requirement that will commit us for many years to a major undertaking in which second best has proved not good enough. All Oklahomans can be proud that at this First National Conference on the Peaceful Uses of Space the position of the United States in the competition for scientific and technological supremacy is presented clearly at a time when the President is calling for the support of the Nation.

In conclusion, let me make it clear that all of the effects of the national space program will not be confined to outer space itself. These effects will go beyond the impression they make in the minds of men around the world. You as a citizen, as a worker, as a parent, as a patient in a hospital, will feel them in your daily life. Already our push into space has produced a ceramic that is made into pots and pans that can be moved from the coldest freezer into the hotest flame without damage. Our study of foods best suited for space flight will lead to improved nutrition for the earthbound. Space research has created new materials, metals, alloys, fabrics, compounds, which already have gone into commercial production. From our work in space vacuum and extreme temperatures have come new durable, unbreakable plastics that will have a wide variety of uses, such as superior plumbing and new types of glass adapted for windows that will filter intense light. Our scientists have devised minute instruments called sensors to gauge an astronaut's physical responses in space, to measure his heartbeat, brain waves, blood pressure, and breathing rate. These same devices could be attached to a hospital patient so that he could be watched by remote control. In the future every patient's condition could be recorded continuously and automatically at the desk of a head nurse.

More than 3,200 space-related products have already been developed. These come from the 5,000 companies and research outfits now engaged in missile and space work. From this new industry will emerge new jobs that will help take up the slack of unemployment.

Those of us who are working in the national space program are convinced that a large part of our future as a nation is at stake. We appreciate the support of those of you who have come to this conference to apply your minds to the space problem, to understand its implications, and to make your own contributions to it.

Thank you very much.

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